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(54) DIGITAL COUPON FOR PAY TELEVISION RECEIVER

(57)Abstract:
PROBLEM TO BE SOLVED: To provide a method and system that give a selective object of promotion of a program service to a specific subscriber or subscriber groupwithout the use of the free charge mode or a paper coupon.
SOLUTION: In the case that a digital coupon is sent selectively to a subscriber terminal in a communication network for promotion and a subscriber purchases a given number of paper view PPV programs at a standard pricea PPV program which is free of charge or discounted is given especially to the subscriber. Terminals 160170 maintain a running balance of a valid coupon credit and informs the subscriber of a valid balance through a user interface. The subscriber receives a coupon as a reward for viewing a commercial messageand the PPV program pays back the coupon. A program service provider retrieves and analyzes terminal use pattern data to collect additional data for general public or a person as an additional back report capability.

CLAIMS

[Claim(s)]
[Claim 1]A controller for transmitting program service to two or more member terminals through a communications channeland said program serviceAre applied so that it may be selectively recovered by said member terminalsaid controller is applied so that a digital coupon may be transmitted to said terminal through said communications channeland by said digital coupon information. A communication apparatus with which said terminal can obtain a credit when recovering the 1st specific program of said program service according to a precondition of said digital coupon informationand said terminal maintains running balancing of said obtained credit.
[Claim 2]A device which is the device according to claim 1and can be used when obtaining said credit at a fee which had the 2nd specific program of said program service reduced.
[Claim 3]Claim 1. Or are a device given in 2comprise a monitor means for monitoring one using pattern in which said terminal was chosen in order to determine whether said precondition of said digital coupon information was satisfied furtherand said using patternIn (a)said which 1st at least one specific program service by said selected terminal. or it recovered -- and (b) -- said 1st at least one specific program service by said selected terminal. A device with which it is at least one recovered index of time intervalin the meantimeand said credit is given when correlation exists between said precondition of said digital coupon informationand said using pattern.
[Claim 4]A user interface for being the device according to any one of claims 1 to 3and repurchasing said credit selectively further according to a user inputand **********.
[Claim 5]A user interface for obtaining a check of user involvementwhen one to which it is the device according to any one of claims 1 to 4and said terminal corresponds further has recovered said 1st specific program of said program serviceand **********.
[Claim 6]Are the device according to claim 3 and said 1st specific program of said program serviceBy said selected terminal. giving two or more individual programs which are adapted so that it may recover individually -- said using pattern -- said selected terminal -- (a) -- the predetermined number of said two or more individual programsand (b) -- by said selected terminalwhen recovering said at least one individual program. A device with which said credit is given when having recovered at least one of the predetermined amount of feeto undertake is shown.
[Claim 7]A means to be a device of a statementto relate to said controller in **** further at claims 1-6and to encipher said digital coupon information and said program service according to a common cryptographic keyand **********.
[Claim 8]Using pattern Account CenterMinistry of Finance which is the device

according to claim 3 and is further connected with said controller in operation******* and said using pattern Account CenterMinistry of Finance a communication link. It is adapted in order to receive information which leads and shows said using pattern of said selected terminal from said monitor meansand said controllerA device which receives said information which shows said using pattern from said using pattern Account CenterMinistry of Finance in order to control transfer in said selected terminal of said digital coupon information.

[Claim 9]A device which is the device according to any one of claims 1 to 8and is adapted so that said controller may transmit different digital coupon information to a terminal from which said two or more member terminals differ.

[Claim 10]In order to recover selectively program service which is a member terminal in a communication apparatus and was received from a controller through a communications channel A meansBy a means and said digital coupon information for receiving digital coupon information from said controller through said communications channelsaid terminalA means and a ******** terminal for maintaining running balancing of a credit which could obtain a credit when recovering the 1st specific program of said program service according to a precondition of said digital coupon informationand was obtained.

[Claim 11]A terminal of a place are the terminal according to claim 10 and usable with a fee which had the 2nd specific program of said program service reduced in said credit.

[Claim 12]Claim 10. Or are a terminal given in 11comprise a monitor means for monitoring a using pattern of said terminal in order to determine whether said precondition of said digital coupon information was satisfied furtherand said using patternIn (a)said which 1st at least one specific program service by said selected terminal. or it recovered -- and (b) -- said 1st at least one specific program service by said terminal. A terminal to which it is at least one recovered index of time intervalin the meantimeand said credit is given when correlation exists between said precondition of said digital coupon informationand said using pattern.

[Claim 13]Are the terminal according to claim 12 and said 1st specific program of said program serviceBy said terminal. giving two or more individual programs which are adapted so that it may recover individually -- said using pattern -- said terminal -- (a) -- the predetermined number of said two or more individual programsand (b) -- by said terminalwhen recovering said at least one individual program. A terminal to which said credit is given when having recovered at least one of the predetermined amount of feeto undertake is shown.

[Claim 14]A communication interface which is the terminal according to claim 12is a communication interface for communicating information which shows said

using pattern from said monitor means further to using pattern Account CenterMinistry of Finance through a communication linkand relates to said controller in ****A terminal which receives said information which shows said using pattern from said Account CenterMinistry of Finance in order that a ********** controller may control transfer in said terminal of said digital coupon information.

[Claim 15]A meansa ******** terminal which are the terminals according to any one of claims 10 to 14and answer a user interface for said terminal to repurchase said credit selectively according to a user input further.

[Claim 16]A meansa ******** terminal which are the terminals according to any one of claims 10 to 15and answer a user interface for obtaining a check of user involvement when said terminal recovers said 1st specific program of said program service.

[Claim 17]A terminal which is the terminal according to any one of claims 10 to 16and is enciphered according to a cryptographic key with common said digital coupon information and said program service.

[Claim 18]An authentication means and a ******** terminal for being the terminal according to any one of claims 10 to 17and attesting said digital coupon information in cryptography further.

[Claim 19]A terminal with which it is the terminal according to claim 18and said authentication means attests said digital coupon information according to a group key.

[Claim 20]A terminal with which it is the terminal according to claim 18 or 19and said authentication means attests said digital coupon information according to a public key.

[Claim 21]Including a program enciphered according to a program re key which it is the terminal according to any one of claims 10 to 20and said program service accompaniessaid at least one specific program re key communicates in said terminaland by it. A terminal with which said terminal can decode a program which accompanies using said program re keyand can be recoveredand said digital coupon information communicates to said terminal with said program re key.

[Claim 22]Through a communications channelfrom a controller to two or more member terminals in a communication network. Are the method of transmitting digital coupon informationand said network program service in order to communicate from said controller to said two or more member terminals. ******and said program service so that it may be selectively recovered by said member terminal. A process aiming at said at least one terminal chosen in order to be the method of being adapted and to receive said digital coupon informationBy a process of transmitting said digital coupon information to said terminal through said communications channeland said digital coupon

informationsaid terminalA process which can obtain a credit when recovering the 1st specific program of said program service according to a precondition of said digital coupon informationa process of holding running balancing of said credit obtained in said terminaland **********.
[Claim 23]How to use [is the method according to claim 22and] itwhen obtaining said credit at a fee which had the 2nd specific program of said program service reduced.
[Claim 24]A process of monitoring one using pattern in which said terminal was chosen in order to determine whether are the method according to claim 22 or 23and said precondition of said digital coupon information is satisfied furthersaid using pattern -- (a) -- said which 1st at least one specific program service by said selected terminal. or it recovered -- and (b) -- said 1st at least one specific program service with a process which is at least one index of time intervalin the meantime recovered by said selected terminal. A process of giving said credit when correlation exists between said precondition of said digital coupon informationand said using patternand **********.
[Claim 25]Are the method according to claim 24 and said 1st specific program of said program serviceBy said selected terminal. giving two or more individual programs which are adapted so that it may recover individually -- method concerned -- further -- said using pattern -- said selected terminal -- (a) -- the predetermined number of said two or more individual programsand (b) -- by said selected terminalwhen recovering said at least one individual program. A process of giving said credit when having recovered at least one of the predetermined amount of feeto undertake is shownand **********.
[Claim 26]A process of receiving information which is the method according to claim 24 or 25and shows said using pattern of said selected terminal further from said monitor means through a communication linkA process of controlling transfer of said digital coupon information to said selected terminal according to said information which shows said using patternand **********.
[Claim 27]A process of being the method according to any one of claims 22 to 26and giving a user input to said terminal furthera process of repurchasing said credit selectively according to said user inputand **********.
[Claim 28]A process of obtaining a check of user involvement when one to which it is the method according to any one of claims 22 to 27and said terminal corresponds further recovers said 1st specific program of said program serviceand **********.
[Claim 29]A process of being the device according to any one of claims 22 to 28and enciphering said digital coupon information and said program service according to a common cryptographic key furtherand **********.
[Claim 30]A process of transmitting digital coupon information which is the

method according to any one of claims 22 to 29and is different in one from which two or more of said members' terminal differsand **********.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention]This invention relates to a communication network like cable TV and satellite TVand the computer network whose service is a charge. Especially a device and a method are given in order to obtain a creditwhen the user of service like pay TV watches a specific program. By this inventionto an individual member terminalthe service provider can transmit credit information in the form of a "digital coupon"as a resultcarries out the promotion of the specific programand pays a televiewer a loyalty as remuneration.
[0002]
[Description of the Prior Art]The cable and satellite TV network whose video service is a charge are common knowledge. That it is common knowledge similarly CompuServeProdigy and America-onlineIt is a computer network service like a Knight-Ridder information servicein addition there are some which can communicate by what can access a databasebankingand shopping servicee-mailand othersand it is a charge altogether. Some networks provided service in free examination form in the past. For exampleit has been viewed and listened to it between the time intervals of the promotion which continues during a day or the second by the member who has to pay a usually additional fee so that a premium program like a movie or a sport channel may receive such a program. In most many casesthis is performed by replacing all the services by a promotion scramble mode of a certain kindand a program uses there the fixed key which scramble is not carried outor is beautiful or is known by all the member terminals. For examplein broadcast environmentthe service provider cannot know any shall access specific service between the present customer or a potential new visitor. Even if feedback is obtained using a telephone line or a certain upper paththe service provider cannot perform useful analysis by many treatment of wavelength doubling of the visitor to service.
[0003]As a resultservice must often be put on the scramble mode which permits free access by everybody including a potential new visitor and the present customeror the defined big group at least. In order that a different program made effective between free previews may appeal to a different interestpublicand a televiewer's generation groupfree service time needs to be extended to carry out the promotion of the service often effectively. For examplealthough a certain televiewer wants to see the action filmother

televiewers may want to see a comedy. Thereforeit is required to recommend it effectively to contract to the additional premium program service for monthly amounts to a televiewer in order to give vast free programs over extra time.
[0004]In order to wait for a visitor anyhow until a free preview interval is completedand to place an order for new service continuouslyin order that it may press the telephone tolerance level of service a provider's reservation centerbetween free preview intervalsupdating and a new request-to-print-out-files rate decreaseand a visitor is stimulated further.
[0005]Various programs may be additionally sponsored based on a la carte dish pay-per-view individuallyand a fee is paid in order that a member may watch one program in that case. A reservation center may be telephonedor a visitor may arrange so that it may have a constant rate of money credits downloaded in their terminalso that this visitor may have the specific recognition or qualification over one program sent to a visitor's terminal. With selection of a pay-per-view (PPV) programthe amount of credits beforehand saved in the terminal decreases. Such PPV is provided in the time (staggered times) which has fixed time or what is called NVOD (near video on demand) to shake. A program is intrinsically transmitted by video on demand (VOD) simultaneously again.
[0006]In a VOD devicewhen a member communicates a purchase signal to the video server arranged at the cable TV device head enda program is transmitted to a specific member by demand. This purchase signal may communicate through the effective upstream channel for examplein a cable TV networkor a telephone line.
[0007]Full use of various commercial techniques to which the purchase of a pay-per-view program is recommended to a member has been made. PPV is often more useful than request-to-print-out-files service for a service provider. When a member purchases a predetermined number of PPV programsor when the money of a predetermined quantity is consumed in a PPV programsuch marketing skill gives a member the credit based on a monthly claim. Otherwisea member mails the network Accounts and Finance Department the paper coupon which can be returned behindand after being in agreement with a precondition for a member to repurchase this couponhe is reduced. For examplewhen one PPV program is purchased at the usual pricea paper coupon gives the right of the credit of 1/2 of the prices of a PPV program to a member.
[0008]
[Problem(s) to be Solved by the Invention]Although such marketing skill is effectivea certain member will be tamed to receive other cuts of a paper coupon and the bill of own every monthand if the cut is not providedhe resists the payment of a higher fee. In other wordsthey will certainly buy itif a coupon is got. After they are in agreement with some predetermined conditionsto give a member remuneration is wished. Additionallyit is not easy

to use a member's group or an individual member as a target selectively or to monitor the effect of such a promotionwithout making all the services into no charge. Since it pays and realization of the cut by a member is delayed during many weeks typically because of delay of a cycle further againthe effect of the conventional promotion decreases. Collecting or treating loses a paper coupon simply difficult.

[0009]Thereforeto give the method and device for giving the alternative target of the promotion of program service to the group of a specific member or a member is wishedwithout [without it puts service on non-charge modeor] using a paper coupon. the time of a predetermined vision pattern being in agreement -- a device -- a member -- early -- credit receptacle **** -- things must be made. This device must give a member a remuneration loyaltyand the purchase of the program service of an additional level like a PPV program and/or premium program service must be recommended to a member.

[0010]A member has to pack a credit by the method of creating an inventory list quickly againand the device concerned must tell a member about the time when service is effective through a promotion. The device concerned must have show with various creditsand a flexible program about how it is used about the time accessed.

[0011]To give the device for monitoring continuation of such a promotion further againto obtain feedback of the custom to which the member is viewing and listeningand to determine the BYUWA ship (viewership) (for examplespectators' size) of a specific program are wished. Encoding technology must be used for it so that to obtain illegally and the device concerned may block the non-permitter (for examplePirates) which tries to tamper with a device about.

[0012]This invention gives the device which has the above and other advantages.

[0013]

[Means for Solving the Problem]According to this inventionwhile a user of service like pay TV is watching a specific programa device and a method for obtaining a credit are given. By this inventionthe program service provider can transmit credit information to an individual member's terminal in the form of [of promoting a specific program and paying a televiewer loyalty] a "digital coupon."

[0014]A communication apparatus according to this invention contains a controller for transmitting program service to two or more member terminals through a communications channel. In a pay-per-view program which requires a TV program to which program service is continuously transmitted to broadcast or a predetermined schedulea specific own alternativeand purchase performed locally or automaticallyand shaking broadcasting hours. Video-on-demand service transmitted only by answering a near video on demand by which pay-per-

view offer is madeand a user requestor electrical information like other computer software may also be included.
[0015]The communications channel can also include a cable plant and/or a satellite link. This programme service is selectively recovered by member terminal. For examplewhen a member tunes up within an onscreen interface like an electronic program guide (EPG)and a channel corresponding using a remote control deviceor a thing for which a purchase order to either PPV or a video-on-demand program is transmitted -- a specific program for viewing and listening can be chosen.
[0016]This controller transmits digital coupon information to a terminal which met program service information using all effective art like frequency or time multipled. When recovering a specific program which is defined by a precondition of digital coupon informationthe terminal can obtain a credit by this digital coupon information. For examplewhen a precondition which purchases five PPV programs at the usual price is in agreementthe member can also receive a credit to one free PPV program. A terminal carries out the track of the balance of a coupon credit automatically as a coupon is given and repurchased. When a credit obtains program service (for examplea discount or no charge) at a reduced feeit is usable in it.
[0017]Each terminal contains a processor which monitors a using pattern (for exampleviewing history) of a terminalin order to determine whether a precondition of digital coupon information was satisfied. for examplethis using pattern -- which program -- less than [these days 1 month] -- or it is shown whether it was recovered by terminal within a time [as which a specific program or program service (for examplechannel) was regarded] within other periods. This terminal gives a coupon simply based on time quantity being spent in seeing an informercial (infomercial) based on the purchase of a PPV program. Thereforea credit is given when correlation exists between a using pattern and a precondition of digital coupon information.
[0018]A user interface like a graphic user interface (for exampleonscreen display) is given so that a member can repay a credit selectively. For examplethis user has various options which should be chosen and cash balance and/or coupon balance are thoroughly repurchased in part in this case. A user interface is used so that it may obtain a check of user involvement (involvement) again. For exampleperiodicallyin order to verify that a member is still watching a programhe may be required as giving some control input signals as a program is displayed.
[0019]a time of program service including an individual program individually recovered by a terminal which is related with the PPV technique -- a number with a specific using pattern of such individual programs -- or when having recovered with a specific quantity of a fee is shownthis coupon credit is

given. A coupon credit is given by this alwayswhen a PPV program is accessed. In order to access a programone or a coupon beyond it is needed.
[0020]Since it permits that a program service provider and an advertising person gain and analyze terminal using datausing pattern Account CenterMinistry of Finance which accompanies a network control machine is given. This using pattern Account CenterMinistry of Finance can receive use pattern information from a terminal through an upper path within a channel with which program service is transmittedor a communication link like a telephone line. Especially this has useful cost made to run within a program at adalthough a BYUWA ship of commercials or an informercial which is often a function of viewership is determined.
[0021]The network control machine can control transmitting digital coupon information to a terminal further again based on reception use pattern information. In this casethe network control machine can transmit a digital coupon to a terminal directly by the same method as a reservation list titlea PPV titleand other titles like credit information. For examplea member who specifies a preference for sports programs receives digital coupon information which gives a cut to a future special sports program.
[0022]Thereforethis controller transmits digital coupon information which is different to a different member based on the public or personal data compiled by use pattern information or other means. This digital coupon information gives the same preconditionin order to obtain a credit which gives a precondition which is different in order to obtain the same creditor is different. For examplewhen the same viewing condition is in agreementit is possible to give a warm treatment member remuneration by giving many coupons rather than other fewer warm treatment members to a warm treatment member who purchases comparatively many programs.
[0023]In order to prevent access to a digital coupon in disapprovalvarious encoding technology is adopted.
[0024]A corresponding member terminal and a method are also given.
[0025]
[Embodiment of the Invention]While viewing and listening to a specific programit is related with a method and a device for the user of program service like pay TV to get a credit. Credit information can be transmitted to an individual member terminal in "digital coupon" form so that a program service provider may promote a specific program by this invention and it may accept a viewing-and-listening royalty. A digital coupon can also be locally generated within a terminal based on the standard sent by the service provideror is directly transmitted as a title by a service provider.
[0026]Drawing 1 is a block diagram of the communication apparatus according to this invention. The device concerned contains transmission and 110the channel

120receptionand 130. The CC machine 130 which transmission and 110 connect with the PPV order processing function 115the use pattern information accounting function 125 of a terminalthe code machine / multiplexer / modulator 150the digital coupon information function 135the program service information function 140And the control data function 145 is included.
[0027]Reception and 130 have many terminals which contain the terminal N (170) from the terminal 1and they receive digital coupon informationprogram service informationand control data through the hub 124 and the course 122. Each terminal has an accompanying display like the television for displaying program service information. For example170 accompanies the display 180. In the shown examplethe terminals 160...170 can connect the PPV order processing function 115 and the use pattern information accounting function 125 through the channel 120.
[0028]For examplein a cable TV networksuch upper communication may be given on the channel separated from the channel with which program service information communicates (for exampleRF spectrum). It may be used in order that the multiplexing technique of frequency division may attain this purpose. In modificationthe time multiplexing technique is used or the terminals 160...170 are connected with the PPV order function 115 and the use pattern information accounting function 125 through a separation communication link like a telephone line. Even if he has the PPV order processing function 115 and/or no use pattern information accounting function 125this invention can be performed so that it may be explained in detail below further again.
[0029]The channel 120 comprises a wireless link like a coaxial cablean optical fiber and/or a satelliteor RF broadcast link. Transmission of a device and 110 may be a cable TV device head enda satellite uplink centeror RF broadcasting centerfor example.
[0030]The digital coupon information function 135 comprises the memory for saving digital coupon information according to this invention. This digital coupon information is connected with reception of a deviceand the terminals 160...170 in 130. When an address is possible for the terminals 160...170digital coupon information is made into a target to the group of an individual terminal and/or a terminal further againfor example according to public data. DEJITA coupon information is transmitted in modification through the course separated from the course of program service.
[0031]Digital coupon information gives the credit which a terminal can use for many purposes. For examplewhen a terminal places an order for one PPV program more than ***** through the PPV processing capability 115digital coupon information gives a cut. As an exampleif a terminal places an order for five PPV programs within a present demand cycleas for a terminala digital coupon credit can order the 6th PPV program for free. Otherwiseto the terminal which

places an order for a PPV program rarelythe terminal concerned can place an order for the first program at half the price with a digital coupon credit. A digital coupon may be automatically generated based on the program coupon standard established by the service provider. The advantage of this is not involving in a service provider directly. A revolution path does not existor this is late or suitable to the broadcast environment which is not set up to bidirectional processing.

[0032]In modificationby digital coupon informationfor nothinga terminal is the fee which decreased in numberor can access premium program serviceand Or a software programa computer gamethe book of electronic formata musical workan onscreen TV program guideOther information like a moviea restaurant reviewor other promotionalinformationaland educational raw materials can be accessed. For exampleby digital coupon information a terminalA premium movie channel can be accessed for two days about each PPV purchaseone computer video game can also be downloadedand the free connect time to a computer database can also be obtained for 1 hour.

[0033]Thereforethe word of the "program service" used hereTelevisionmultimedia and other audios and/or a video signal and the computer software it is accessed by the terminal or is connected through the channel 120or all virtual information are included. A thing provided with profits like the price which the word of the "credit" decreased when a terminal obtained program service through access and/or a channelor was abandoned hereOr it is for obtaining goods through the channel delivered by the member by other means (for examplemail).

[0034]The terminals 160...170 do not realize the credit provided by digital coupon information until they satisfy a precondition with a terminal. Each terminal has a means for monitoring various factors which define the use pattern information of a terminal covering the defined time intervaland it for exampleIn the number of the purchased PPV programsthe quantity of the PPV fee by which load was carried outand how much time. It is included whether whether it changed to a program or program service with a specific terminalwhether the terminal's having been upgraded to one or more premium program services recentlyand a promotional time interval are effective. A promotional time interval may be applied to the terminal group chosen as an individual terminal like those new membersor all the terminals.

[0035]Thereforethe monitor means in a terminal monitors the above-mentioned factorin order to determine whether the using pattern of a terminal corresponds to the precondition of digital coupon information. setting to a "report back" function additionally -- use pattern information -- the hub 124 and the channel 120 -- or it is periodically transmitted to the use pattern information accounting function 125 from a terminal through a telephone line

in modification. For exampleusing data is transmitted every day every week or every month.
[0036]Such use pattern information gives the product and service with which they are likely to be pleased to the useful information to the program service provider and those [advertising] who are used for the individual member and member group of a better target. With datathe using pattern can determine the effect of a promotion with various interested persons (for examplea promotor and an advertising person) further again. For examplewhen digital coupon information is able to give the PPV program of half the sum to the member who places an order for PPV rarelythe success percentage of a program is determined from use pattern information in the function 125.
[0037]When digital coupon information gives free access for two days to one of many the effective premium program services in other examplesThe selected premium program service is monitoreda member is continuously provided with a digital couponand he can upgrade by it to the selected premium program service (at for examplehalf the sum usual only in the first moon). In order that other various commercial strategies may strengthen trust of an income and a visitorit is used for this invention. For examplea free PPV movie coupon credit is given to a member on his birthday.
[0038]Digital coupon balance is adjusted according to a lotother contestsor a game. For examplewhen gold of a certain quantity has been usedthe member can substitute an additional coupon and can participate in a lot. Otherwisethe member can also play the bidirectional game as which a match is determined with a coupon.
[0039]Howevereven if the report back of the use pattern information is not carried out to the function 125it can be determined whether use pattern information of the monitor means of a terminal corresponds with the precondition of digital coupon information. Suitablythis is performed by a safe method so that it may explain in detail belowand the Pirates may not tamper about.
[0040]By the controller 130the digital coupon information from the function 135 is enciphered and multiplexed in a code machine / MUX / modulator 150 along with the program service information from the function 140and the control data from the function 145. Program service information comprises the video and/or audio information which are locally saved to a preservation medium and/or are received from external sauce like a satellite down-link. This program service information comprises computer software or other electronic intelligence in modification.
[0041]Control data contains the encryption data used in order to generate a working key in a terminalin order to carry out decoding of the received data. Typicallyone or the premium program service beyond it is connected with basic

program service through the channel 120. Both the basics and premium program service are accessed by possession of a proper group key or plural keys. A group key or plural keys are transmitted as a part of title management message (EMM). By possession of the group key or plural keys which met the suitable title control datathe terminal can recover the program key from the program data sent by the service provider given into a title control message (ECM).
[0042]By a program keythe decipherment or derivation of a working key used can encipher a program signal in uplink or a head end sideor can decode the program signal of a down-link or a visitor's decoder side. The "restorative" word shows that it is received and program service is searched in a terminal here so that it may be used by a member (for exampledisplay).
[0043]The control data contained in a title control message (ECM) is used in order to control access to specific program service (namelychannel). Since this ECM control data is permitted so that specific program service may be accessed and it may recoverit is shown that a title needs to be held by a terminal. It is used also for the ECM message which transmits control data information transmitting program key information typically. Thereforean ECM message not only defines a program parameterbut transmits a key or a precedence key (for exampleplay key).
[0044]This ECM control data may also contain the data for giving the cost for placing an order for a PPV program to a terminal further. Furthermorethis control data may point to cost with the number and type of a coupon required to access a program in accordance with the details of others which list how many coupons are required for a cut.
[0045]Drawing 2 is a block diagram of the member terminal according to this invention. The same numerals are used for the same element as drawing 1. The demultiplexer / demodulator 205 of the terminal 170 receive program service informationdigital coupon informationthe course 122and the control data from the hub 124. Demultiplexing and DEMOJURE Tyng are performed using conventional technology. The enciphered program service is given to the decipherment processor 212 and the switch 218 through the lines 210 and 214respectivelyandon the other handthe control data and digital coupon information which were enciphered are given through the line 230 to the protection processor 220.
[0046]The enciphered program service is decoded by the decipherment processor 212and gives a clear signal in the output 216 of a decipherment processor. The protection processor 220 may receive the digital coupon information decoded from the decipherment processor 212. The decipherment processor 212 uses the conventional decipherment technique. For exampleUnited States patent 4th by Gilhousen and others613Title "Signal Encryption and Distribution System for Controlling Scrambling and Selective Remote Descrambling Televisionof No. 901

Singnals "title [or] of U.S. Pat. No. 4864615 by Bennett and others" Reproduction of SecureKeys By Using Destributed Key Generation. Data" is incorporated here as a reference.

[0047]A decipherment processor needs a working key (WK) so that it may decode the signal inputted there through the line 210. This working key answers the control signal received through the line 230is depended protection processor 220 and generated. The firmware for protection processors is saved in the read-only memory (ROM) 224. The protection processor 220 is provided with random access memory (RAM) again. The protection part of RAM222 holds the seed (seeds) who uses it by the decipherment of a group key the specific key of a simple substanceand/or every month so that it may be later explained in detail in connection with drawing 3.

[0048]With the user interface 226the televiewer can choose a programwhile watching the television 180. If a user is permitted receiving the service selected with the memberindividual purchase (for examplepay-per-view)and digital coupon creditThe protection processor 220 operates the switch 218 so that the output 216 decoded from the decipherment processor 212 may be connected with the television 180 through the user interface 226. Otherwiseit is only that a user interface and television receive the signal enciphered through the line 214 and the switch 218. As everyone knowsthe switch 218 is constituted by turns by the person skilled in the art so that a signal may not be given at allwhen access to the service which gave the user the barker (barker) channel (for examplefixed message)or the user chose is not permitted.

[0049]It monitors a program with the user selected through the user interface 226 in order to determine whether to be in agreement with a preconditionin order that the protection processor 220 may get [a user] a digital coupon credit. For examplewhen five PPV is usually purchased at a pricesupposing a digital coupon gives a credit to one free PPV programa protection processor will record generating of the purchase of a PPV program. Since corresponding data is savedRAM222 is used. Thereforealthough use pattern information contains the data related to a digital coupon preconditionother own alternatives can be included similarly. The communication interface 230 like a data modem is givenand the terminal can transmit the order for VOD programsor the type of a certain kind which needs permission of a service provider in order to incorporate of program to the PPV order processing function 115 of drawing 1. PPV purchase which was locally processed by the terminal and was saved internally in the terminal is shipped for bills to a PPV processing capability. With the interface 230the terminal 170 can transmit use pattern information to the use pattern information accounting function 125 of drawing 1.

[0050]A terminal receives control data in the form of the title management

message (EMM) which gives the first currency (currency) credit balance to the terminal 170. In this casewhen a user places an order for a PPV programall the currency credit balances decrease only the cost of a program. The EEM message produced from a service provider is the first stageor even if it transmits an additional coupon credit to a terminalit is not necessary to carry out it.
[0051]A coupon credit is generated when the precondition for obtaining a digital coupon credit is realized typically. A coupon credit balance is adjusted immediately. Supposing an early credit balance is 40 dols so that it may be shownthe price of the cost of each PPV program is 5 dols. Thereforeafter the first five programs are purchaseda credit balance descends to $35$30$25$20and $15 continuously. As for use pattern informationat this timeone the increment of the coupon credit balance is carried out in accordance with the precondition of digital coupon information.
[0052]The increment of the coupon credit balance is carried out only one about each PPV purchase in modification. When a terminal aligns to the 6th programa terminal receives the title control message (ECM) for programs. ECM is used for a terminal in order to determine a different method by which the program will be accessed. If the program is effective by a couponECM will describe currency cost and coupon cost. A terminal determines whether to be noalthough the terminal concerned has a coupon automatically. If hada televiewer will be automatically provided with a program or the purchase of a program will be demanded from a televiewer using currency or a coupon.
[0053]By choosing a coupon optionthe next order for PPV programs is given for nothingand the decrement of the coupon credit field is carried out suitably. Thereforebalance is still $15. In modificationeven if a terminal is charged to the 6th programa protection processor carries out the increment of the credit balance by costandas a resultchange of a network is not produced in a credit balance. A protection processor gives the display on the user interface 226and it tells that the precondition of it of digital coupon information corresponded to the televiewer. Of coursewhen a corresponding precondition is in agreementaccumulating to a coupon credit is also possiblebut a credit is not realized. a credit -- between the predetermined time intervals in 2 or March -- or -- or it is indefinitely held within a terminal.
[0054]In order to determine a credit balance in accordance with other pertinent informationa televiewer may suspect the user interface 226so that it may furthermore be explained in detail in connection with drawing 4 - 6.
[0055]Drawing 3 is a block diagram showing the decipherment stage for using it according to this invention. For enciphered program Prekivia the terminal 340it is received through the terminal 342 and a group key is inputted into the decipherment function 344 every month. Program Preki is specific to each enciphered effective offer program (for exampleTV program) to a decipherment.

A group key changes per month once periodicallyfor example. The decipherment function 344 decodes enciphered program Prekiand gives program Preki used as one input to the one-way function 348. The input to the other one-way functions 348 comprises various programs and a coupon attributeand it contains an access request like a coupon and currency cost to a corresponding program. This access request must be in agreement so that it may obtain the permission for watching a program. A program and a coupon attribute are inputted through the terminal 346and a one-way function processes program Preki and a program attribute so that it may obtain a program key.

[0056]The program key outputted from the one-way function 348 is used as one input to other one-way functions 352 to receive initialization vector (IV) which expresses time through the terminal 350. Processing of the initialization vector by the one-way function 352 and a program key generates the working key demanded by the decipherment processor 212 of drawing 2in order to decode program service with the selected authorized user. The details of various generation of a key containing a working key (given within a "key stream") are shown in the above-mentioned Bennett's and others patent.

[0057]Additionallydigital coupon information and program service are enciphered according to a common cryptographic key. The attested file showing a coupon image can be transmitted to a decoder by this. this coupon -- a coupon -- the program service provider from a decoder -- or it is repurchased as an image attested later by transmitting to other Account CenterMinistry of Finance.

[0058]Drawing 4 is an onscreen display for user interfaces according to this invention. The display 400 is called as a part of graphical user interface (GUI) which a user can choose a channel and can control volume etc. Such an interface is well-known art. The display 400 is controlled by the useful means of portable remote controlan arrow devicea voice commandor others. For examplea user may choose a PPV program like the movie from the graphical user interface made to appear on the display 400.

[0059]The display 400 includes the field 410 where he informs a user of not being a member of the program selected now. That isthe user has to place an order for a program. The field 420 tells having an option which is different to a user in the case of a program order of it. The fields 430-460 give an option. The field 440 gives the 1st option purchased as an impulse-pay-per-view (IPPV) program which has the cost by which the movie is deducted from the effective cash credit balance. Thereforea user is told the cash cost and the effective cash credit balance of a movie. A program is purchased as long as sufficient cash credit balance exists.

[0060]The field 450 gives the 2nd option and a program is purchased there only using a digital coupon. A user is told the coupon cost and the effective

coupon credit balance of a movie. A program is purchased as long as sufficient coupon credit balance exists. A digital coupon is called the "TV" coupon here.
[0061]The field 460 gives the 3rd option and a program is purchased there using the combination of cash and a digital coupon. A user is told the costthe effective cash credit balanceand coupon credit balance of a movie which use both a coupon and cash. Although one cash / coupon combination are given to the field 460probablyit turns out that other combination is given. [only] Worth of cash is actually assigned to a coupon for this purpose.
[0062]In other optionsalthough not illustratedif a member is going to make the commercial message which does not exist by other methods appeara member will place an order for a PPV program for a cut. For examplethe commercial message which uses a teletext appears in a part for the lower part of a screenwhile he is seeing the PPV movie. Or when the reduced program is chosen about VODthe selected PPV movie has a periodic commercial message breakbut commercials are not given.
[0063]Drawing 5 is other onscreen displays for user interfaces according to this invention. Herethe display 500 gives a number of a coupon credit of information accumulated while viewing and listening to a different channel. For examplevarious program service providers give a coupon based on the number of time and/or which program of the service provider seen to the televiewer at one week he watched.
[0064]The fields 510 and 530 list various program service providersandon the other handthe fields 520 and 540 list the number of the accumulated coupon credits. For examplethe balance of four coupons exists to the home box office (HBO) of a service provider. In this methoda program service provider competes so that it may stimulate a viewer ship. For examplean additional coupon may be given when a new program starts. A coupon can be accumulated further again based on the day for the time of a dayor one week when it is viewed and listened to a program. The program service provider paid ordinarily gives a couponin order to stimulate the viewer ship of their program.
[0065]Drawing 6 is other onscreen displays for user interfaces which follow this invention further. The display 600 gives the example of various items chosen using the digital coupon in which a member follows this invention. Each program service provider which met other interested persons provides its item. the display 600 with the specific field 610 -- the Cable News Network (CNN) of a service provider -- thena certain thing is shown. The field 620 shows the coupon credit balance of KARENTOon the other handthe field 630 shows the item obtained and the field 640 shows the number of coupons required to obtain each item.
[0066]Thereforea user contains the off duty group item delivered by a user's home with the additional program and mail which can repurchase very various

digital coupons for itemsare accessed by the terminalor communicate to it.
[0067]Some items do not need a digital coupon at all. For examplethe field 650 describes the product information which communicates to a member's terminal or is delivered for nothing by a member's home. Howeverwhen a member demands product informationuse pattern information is given continuously to the use pattern information accounting function 125 of drawing 1 which is updated and is used by commercial ends.
[0068]Drawing 7 is a flow chart which shows the method for giving the digital coupon according to this invention. This flow chart shows an example and the first cash credit balance is once given on a standard there in a terminal in the moon. Thereforewhen you would like to watch a program like the PPV program which has the cost which a user accompanies and it wantsthe cost is deducted from a cash credit balance. When in agreement with the precondition of digital coupon information as which a user is determined by use pattern informationa coupon credit balance is accumulated. It is used for this coupon credit balance paying the cost of the additional already purchased programin order to purchase additional program service instead of cash. In the case of the lattercash value is assigned to a coupon credit.
[0069]In the block 705the controller of a transmitter transmits an initial cash credit balance to a terminal. The quantity transmitted to each terminal differsrespectivelyfor exampleit succeeds in them based on the custom of the past purchase. In the block 710a controller transmits digital coupon information to a terminal. Againa different terminal may receive different coupon data according to a public factor etc. A terminal using pattern is monitored and recorded in the block 720. Especially the event that is in agreement with the precondition of a digital coupon is recordedand other data in which a user custom is shown on the other hand is recorded.
[0070]A digital coupon precondition describes various events like whether a number of PPV programs with which the member was given were purchased in M latest days (block 722). In that casedigital coupon credit"1" is given with the block 724. A different type and the coupon of quantity are given according to the specific precondition corresponding [a televiewer's]. For examplea certain coupon credit is repurchased by profits which it is worthy from something elseor are different.
[0071]In the block 726determination of that the member purchased X$ of the PPV program in Y latest days will give digital coupon credit"2" with the block 728. In the block 730if a member views and listens to an "informercial" in Z minutesdigital coupon"3" will be given to the block 732. An "informercial" is a commercial message which has the length of the standard program beyond 1/2 hour or itand a formatand obtains generally comparatively few audiencesfor example. Even if it is a case where there is no fee which should be undertaken

in order to watch a program even if for the commercial purposeto give a televiewer a viewing-and-listening informercial is wished. Additionallya coupon credit is given only to viewing and listening of the beginning of a programandas a resultan additional coupon credit is not given to re-viewing and listening of an identical program.

[0072]In the block 734if a member is upgraded from a basic program hierarchy to a premium program hierarchy or a higher premium program hierarchydigital coupon"4" will be given to the block 736. In the block 738if a promotional time interval is advancingdigital coupon"5" will be given to the block 740. Such a promotional time interval is generally applied to all the members.

[0073]The total amount of a coupon credit is determined in the block 750. In the block 760if a coupon credit balance is more than zeroIn the block 770when a user repurchases a digital coupon with a user interface (it is always when television sticks)choosing from effective various options is demanded from him. For examplea member places an order for the PPV program which receives without a cut or a feeand accesses a premium program between predetermined time intervalsor passes simplyand uses an effective option for other time. Various options have been explained in detail by the relation between drawing 4 - 6. In addition to the periodic prompt described abovethe user can access a coupon repurchase menu now through remote control at any time.

[0074]In the block 780digital coupon balance is adjusted by the number of the coupons repurchased in the block 770and the monitor of a terminal using pattern is continued with the block 720.

[0075]It is possible by requiring a certain kind of member involvement to prove that the user is actually viewing and listening to a specific program. For examplein order to prove that the member looked at the informercial in Z minutesit is required that a terminal should input a command into a user interface to a member. This user interface gives a message like "Do you wish to continue"and a member has to answer to it so that he may make it in agreement with a digital coupon precondition. It is stopped by the internal timer of a terminal until a response is received.

[0076]In order to guarantee that the coupon of only one set is given for every program to the member who views and listens to information etc. The COUPON_RECORD_DURATION field which is explained below by drawing 3 is given so that program record of information may show the time interval saved in a terminal. This prevents the member from same obtaining again the same coupon for informercials that flows repeatedlystill making possible the same program ID to the informercial by which repeated use should be carried out.

[0077]The above-mentioned data transmission syntax according to this invention is indicated in the following tables 1-4. Tables 1-3 explain the data field usedrespectively when a digital coupon is transmitted to a terminal using

EMMan IPPV ECM purchase linkand program re key ECM. Table 4 explains the data field used with all the methods of communication. The illustrated syntax is a thing only for a graphic displayand other data transmission techniques and a shift are possible for it.
[Table 1]

[Table 2]

[Table 3]

[Table 4]

[0078]In order to block copyright infringementit is only that a digital coupon provides a member with the impulse PPV accounting on which the place where the report back exists was established. For examplethis becomes effective by using a bit as a flag of either the group re key EMM or program re key ECM.
[0079]According to the report back feature described above by the relation with the use pattern information accounting function 125 of drawing 1a program service provider and the network control machine can monitor the audience size to a different program. Thereforeby use of a digital couponthe service provider can detect a BYUWA ship pattern over the big section of the program which is not premium show. In other wordsthe show which is not effective may be validated by PPV with a coupon.
[0080]In the following program transfer scenariosit is assumed that the real channel (namelyprogram) which can be purchased with a coupon must exist. This may be carried out by carrying out hashing of the program information so that it may generate a program key so that it may be explained below. Thereforeif not actually provided for a coupon holderit is viewed and listened to a program using a digital coupon.
[0081]Howeverthe Pirates tries to tamper with transfer of a coupon about. The main purposes of the Pirates are to tear a device by giving a fake message (for exampleit deceives)and they obtain a digital couponwithout as a result performing all coupon preconditions. According to this inventionit argues about other methods of transmitting the COUPON_CREDIT field to a terminal safely.
[0082]In order to transmit a digital couponthere are the group re key EMMan IPPV purchase linkor the three methods of using program re key ECM. Group re

key message art treats distributing a coupon to a general parent population terminaland gives the method to IPPV purchase linked simultaneously. Howeverit succeeds in an IPPV purchase link independently of group re key message transfer. About program coupon re key arta network control machine or a PPV order processing centerIn order not to know how many coupons a member will receive using the method that a coupon is generated internallyby a terminaltransfer of the coupon which led the group re key message is exclusive from program re key art to mutual. Thereforeif the track of the group re key based on a coupon is not independently carried out from the program re key based on a couponthe management of a group re key based on a coupon cannot be safely treated inside a terminal.

[0083]direct transfer of the coupon which led the group re key title management message (EMM) transmits a coupon to a member -- it is the direct method most. This approach is very suitable for the IPPV service provider it is determined that will give a specific member remuneration for examplebased on the quantity purchased previously. Thereforea service provider knows which specific member should receive a digital coupontherefore turns single specific EMM to each member.

[0084]Additionallythe approach of the group re key EMM is suitable for giving a member a digital coupon along with the specifier which brings about text message commercials. These onscreen displays carry advertisement and are placed by the crowning of the displayed video and an audio. As described abovethese members are going to look at such an advertisementin order to acquire a digital coupon profit like the cut to other programs. Againa service provider gives the digital coupon which knows correctly whether it will have agreed with having the text message advertisement in which which member was transmittedtherefore corresponds to them through EMM.

[0085]COUPON_CREDIT and a VH_LIMIT data field are used and an individual service provider sends a digital coupon to an individual member further again. Each service provider is identified by field VIDEO_PROVIDER_ID. The Pirates compounds a group key message with fake VIDEO_PROVIDER_ID and COUPON_CREDITIf the group key mistaken as a result is generatedthe Pirates can create the pair of fake VIDEO_PROVIDER_ID and COUPON_CREDIT in a terminal.

[0086]One solution of the above-mentioned problem is performed using EMM attestation. If the group re key EMM is especially used in a transmitting satellitehashing of it will be carried out. After thatthis hashing is enciphered in order to create a sign. The Pirates cannot generate the forged group re key EMM without the knowledge of the unit key of a terminaland a key hierarchy. In this casea forged message is refusedwithout being processed. Other methods for attesting a message are using a public key encryptionin order to encipher a sign or all the messages. This bars generation of a forged

message again.
[0087]The Pirates uses further again the attack "to repeat" using the message established lawfully. In this casein order to make a message first and to make new COUPON_CREDIT in a terminalafter being used firsta lawful message is saved and is given to a terminal every month. In order to protect against thisthe increment of the group sequence number is carried out.
[0088]The Pirates tries to repeat a message within the same moon as the message having been generated. In order to protect against thisthe track of new COUPON_CREDIT is carried out during a specific moon. It is added to COUPON_CREDIT earned in the previous month at the end of the month. When COUPON_CREDIT_FIELD is sent to the period terminal throughout the month by the group re key EMMit is the absolute coupon credit published to the specific terminal. In order to manage the coupon from a specific service provider during the moonCOUPON_DEBIT of the additional field is created in a terminal. Other methods of opposing the repetition attack within the same month are arranging EMM itself in order. The decoder can accept then the difference between the messages before regarded as the new message. Other methods contain the day/time parameter in EMM. Although there are whether this field goes with it being about a sequence number to the front similarly or it stopsa change is not made to the past value.
[0089]Since such a repetition attack cannot be prevented in using only signing a message or a public key encryptionFor examplein a group re key message like COUPON_CREDIT and the VH_LIMIT fieldnew COUPON_CREDIT must be attested to the service provider according to each. The track of the sequence number which directs the time of each new coupon record being generated must be carried out. If group key epoch occurssince the message of the group re key EMM used in order to make coupon record first is oldit cannot make an additional coupon. New COUPON_CREDIT is then added to old COUPON_CREDIT. If a coupon is not sent to a terminal by the end of the following moonand if all the existing coupons are usedall the coupon records will be then eliminated.
[0090]In the 2nd digital coupon method of communicationa coupon is transmitted through an IPPV purchase link. About each IPPV purchaseby one bit in a program re key message a service providerOne or the coupon beyond it can be transmitted to a member automatically and immediatelywithout performing a "trip" also with also waiting to obtain the report back like the above-mentioned group re key method together with a coupon. Supposing the member does not have a coupon from a front specific service provider at allnew service provider coupon record will be created. Thereforethe coupon creation process is firmly linked with the actual purchase of the IPPV program. When many coupons arise as a resultthe member can repurchase it. Typicallya service provider provides the digital coupon which can be repurchased only to the

program of the service provider. Howeverhe can also tie up so that he may give an exchangeable couponif the group of a service provider is required.
[0091]It may operate the number of the coupons given when performing a digital coupon precondition which purchases many IPPV programs as a possibility of the attack on other Pirates. One possible measure is using the public key encryption of the DES hash which has a code (for examplesign)or a program re key message. If the number of coupons is attested in the IPPV report backoperation of the Pirates in this field will produce the mistaken code field.
[0092]If the Pirates knows the group keyand if it is used in order that viewing-and-listening history information (for exampleuse pattern information) may hash a coupon placeand it is sent within the report backit is detectable although forgery may arise.
[0093]If a public key encryption is used by transfer of a program re key messageeven if the Pirates will get to know a group public keysince there is no group individual key **********a message will not yet be compounded. Since a group code or an individual key does not exist in a terminala public key encryption has a separate advantage to a secret-key code. As a resultthe attack on the terminal of VLSI probing and others cannot show a key.
[0094]In the 3rd method of communication according to this inventionit is distributed in relation to the extended commercial program which is known as an "informercial." Suitablyonly after a member views and listens to a program between specific timea digital coupon credit is given. It is advantageous to require member difficulty of a certain kind like the control input demanded with a user interface further again so that a member cannot do change and a change of a program simply.
[0095]Since the Pirates gives a member difficult control signal automaticallyit can also change the code in a non-protecting processor. Howeveror it was viewed and listened to a programthe number of time adjusted at least is protected. The informercial service provider does not have to carry out the track of the maximum long time which a program followsin order to perform thissince it has paid the member so that it may view and listen to a program intrinsically. The PROGRAM_PAYOUT_DURATION field is loaded in a countdown timer and forces the requirements for the minimum viewing time of a digital coupon precondition. Thereforea coupon is publishedwhen timer countdown grows into zeroand when it is timer countdown when an informercial channel aligns. Intrinsicallyit ties and this blocks alignment of other channels so that a terminal may be aligned to an informercial.
[0096]The COUPON_RECORD_DURATION field is required of determining the time of program record being eliminated from a protection processor memory further again.

[0097]The Pirates is going to operate the field in program re key ECM which shows how many coupons were givenwhen it views and listens to an informercial. One possibility is using the public key encryption of DES hash (for examplesign) or a program re key. Signing a program re key message like other attacks described above makes it difficult to forge a program re key message that there is no knowledge of a group secret key or an individual key for the Pirates. If a public key encryption is further used by transfer of a program re key messageeven if a group public key will be then known by the Piratessince the group individual key is not knowna message will not be compounded.

[0098]As a possibility of the attack on other Piratesthe Pirates records a lawful program message and reproduces this message repeatedly to a terminal. in order for the Pirates to make the number of the coupons held by a chip increase -- a direct chip -- or a terminal is corrected so that a control input may be given through a user interface. Dealing with this attack is creating program record and saving in a memory. Especially the COUPON_CREDIT field is used in order to attest the number of the coupons given. In addition to COUPON_PKG_ID and COUPON_PROVIDER_IDnot one but two time interval timers are needed. COUPON_RECORD_DURATION which is the one [remaining] by COUPON_PAYOUT_DURATION which is one timer carrying out the track of the time when a member has to align a programbefore a coupon is givenThe track of the time of program record being emitted from a memory is carried out.

[0099]Transfer of the program re key message by a public key is a safer mechanism. The Pirates needs to look for a group individual key in cryptographyin order to change a program re key message. A group individual key is not transmitted to any terminals on a network. The group public key length transmitted is extended according to the threat of the copyright infringement perceived. a group -- it may change with transfer of public EMMs with a new individual key. Existence of systematic infringement will abandon the informercial feature simply by permitting an IPPV purchase in which program re key ECM which has the coupon issue feature is made to lose depending especially or according to a coupon.

[0100]In the above-mentioned argumentit turned out that the three different methods of transmitting a coupon to a terminal exist. Based on the group re key EMMthe 2nd method is hard to IPPV attestationthe 1st method is tied upand the 3rd method is based on program re key ECM which uses an "informercial" concept.

[0101]As opposed to each service provider which the group re key method is similar to the method by which IPPV is performed only by COUPON_CREDIT given thoroughlyand has COUPON_PROVIDER_ID. It is required that the COUPON_DEBIT field should exist in the inside of a terminal.

[0102]Since an IPPV purchase linking method is transmitted by program re key ECM which is already performedand uses the IPPV attestation safely attested inside the terminaland has a still more suitable parameter setThis method is a hybrid between the group re key method and the program re key method. The coupon which uses this method is transmitted only by actual IPPV purchase.
[0103]That repurchase of the coupon is connected to the viewing history report back about the program re key method is whether buys and there is. Since a communication link like a telephone line is requiredcoupon recovery has been connected with the report back about accountant's inspection of a BYUWA ship.
[0104]Thereforethis invention gives the system for transmitting a digital coupon to a member for the purpose of various promotions. By transmitting and managing a coupon electronicallyas for a coupona member becomes is easier to be usedand a promoter's distribution and handling cost decrease dramatically. Although a member loyalty is giventhe member is selectively used as the targetin order that they may examine the program which is easy to have a special interest. A member is recommended to view and listen to a commercial program like an informercial. The effect of a promotion is determined about the additional report back featureand popular and in order [being additional] to collect personal dataterminal use pattern information is searched and analyzed. The completeness of a technique is guaranteed with various encoding technology further again.
[0105]Although the specific example with various inventions has been describeda person skilled in the art is just going to get to know that various addition and corrections are possiblewithout separating from the thought and the mode of an invention which were indicated to the claim.
[0106]For examplethe accounting of a coupon credit balance may be maintained by other components which are separated from a network control machine or a terminal. at the same time coupon balance changes like [when the report back function of automatic telephony can give this accounting] -- real time -- or it is upgraded periodically.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1]Drawing 1 is a block diagram of the communication apparatus according to this invention.
[Drawing 2]Drawing 2 is a block diagram of the member terminal according to this invention.
[Drawing 3]Drawing 3 is a block diagram showing the decipherment series for using it according to this invention.

[Drawing 4]Drawing 4 is an onscreen display for user interfaces according to this invention.
[Drawing 5]Drawing 5 is other onscreen displays for user interfaces according to this invention.
[Drawing 6]Drawing 6 is other onscreen displays for user interfaces according to this invention.
[Drawing 7]Drawing 7 is a flow chart which shows the method for giving a digital coupon according to this invention.
[Description of Notations]
110 Transmitting end
115 PPV order processing function
120 Channel
122 Course
124 Hub
125 Use pattern information accounting function
130 Controller
135 Digital coupon information function
140 Program service information function
145 Control data function
150 A code machine / multiplexer / modulator
160 Terminal
170 Terminal
180 Display

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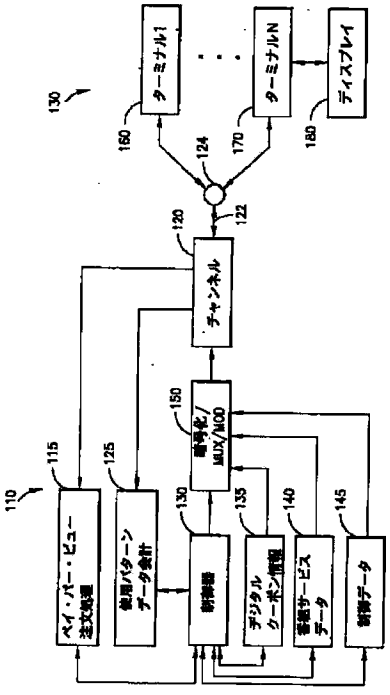
(54)【発明の名称】　ペイテレビ用デジタルクーポン

(57)【要約】　（修正有）

【課題】無料化モードや，若しくはペーパークーポンを使用することなく，特定の加入者や加入者のグループに対して番組サービスのプロモーションの選択的目標を与える方法及び装置を与える。

【解決手段】デジタルクーポンがプロモーション用に選択的に通信ネットワーク内で加入者ターミナルに送信され，加入者が与えられた数のPPV番組を標準価格で購入するとき，特に無料若しくは減額されたペイパービュー(PPV)番組が与えられる。ターミナルは有効クーポンクレジットのランニングバランスを維持し，かつユーザーインターフェースを通じて加入者に有効バランスを知らせる。加入者は，商業メッセージを視聴する報酬としてクーポンが与えられ，それはすぐにPPV番組に買い戻される。付加的なレポートバック能力として，付加的な大衆及び個人のデータを収集するために，ターミナル使用パターンデータが番組サービスプロバイダーによって検索され分析される。



【特許請求の範囲】

【請求項１】通信チャネルを通じて複数の加入者ターミナルへ番組サービスを送信するための制御器と，前記番組サービスは，前記加入者ターミナルによって選択的に回復されるように適用され，前記制御器は前記通信チャネルを通じて前記ターミナルへデジタルクーポンを伝達するよう適用され，前記デジタルクーポン情報によって前記ターミナルは，前記デジタルクーポン情報の前提条件に従って前記番組サービスの第１の特定の番組を回復するとき，クレジットを得ることができ，前記ターミナルは得られた前記クレジットのランニングバランスを維持する，通信装置。

【請求項２】請求項１に記載の装置であって，前記クレジットは前記番組サービスの第２の特定の番組を減額された料金で得る際に使用することができる，ところの装置。

【請求項３】請求項１または２に記載の装置であって，さらに前記デジタルクーポン情報の前記前提条件が満足されたか否かを決定するべく前記ターミナルの選択された一つの使用パターンをモニターするためのモニター手段から成り，前記使用パターンは，(a)いずれの少なくとも一つの前記第１の特定の番組サービスが前記選択されたターミナルによって回復されたか，及び(b)少なくとも一つの前記第１の特定の番組サービスが前記選択されたターミナルによって回復されたその間の時間間隔，の少なくとも一つの指標であり，前記デジタルクーポン情報の前記前提条件と前記使用パターンとの間に相関関係が存在するとき，前記クレジットが与えられる，ところの装置。

【請求項４】請求項１から３のいずれかに記載の装置であって，さらに，ユーザー入力に従って前記クレジットを選択的に買い戻すためのユーザーインターフェースと，から成る装置。

【請求項５】請求項１から４のいずれかに記載の装置であってさらに前記ターミナルの対応するひとつが，前記番組サービスの前記第１の特定の番組を回復しているとき，ユーザーインボルブメントの確認を得るためのユーザーインターフェースと，から成る装置。

【請求項６】請求項３に記載の装置であって，前記番組サービスの前記第１の特定の番組は，前記選択されたターミナルによって個別に回復されるよう適応される複数の個別番組を与え，前記使用パターンは前記選択されたターミナルが，(a)前記複数の個別番組の所定の数，及び(b)少なくとも一つの前記個別番組を回復する際に前記選択されたターミナルによって負う所定の料金額，の少なくとも一つを回復したことを示すとき，前記クレジットが与えられる，ところの装置。

【請求項７】請求項１から６に記載の装置であって，さらに前記制御器に作働的に関連し，共通の暗号キーに従って前記デジタルクーポン情報及び前記番組サービスを暗号化する手段と，から成る装置。

【請求項８】請求項３に記載の装置であって，さらに前記制御器と作用的に関連する使用パターン会計センターと，から成り，前記使用パターン会計センターは通信リンクを通じて前記モニター手段から前記選択されたターミナルの前記使用パターンを示す情報を受信するべく適応されており，前記制御器は，前記デジタルクーポン情報の前記選択されたターミナルへの伝達を制御するために，前記使用パターン会計センターからの前記使用パターンを示す前記情報を受信する，ところの装置。

【請求項９】請求項１から８のいずれかに記載の装置であって，前記制御器は，異なるデジタルクーポン情報を前記複数の加入者ターミナルの異なるターミナルへ伝達するよう適応される，ところの装置。

【請求項１０】通信装置内の加入者ターミナルであって，通信チャネルを通じて制御器から受信された番組サービスを選択的に回復するために手段と，前記通信チャネルを通じて前記制御器からデジタルクーポン情報を受信するための手段と，前記デジタルクーポン情報によって，前記ターミナルは，前記デジタルクーポン情報の前提条件に従う前記番組サービスの第１の特定の番組を回復する時にクレジットを得ることができ，得られたクレジットのランニングバランスを維持するための手段と，から成るターミナル。

【請求項１１】請求項１０に記載のターミナルであって，前記クレジットは前記番組サービスの第２の特定の番組を減額された料金で使用可能である，ところのターミナル。

【請求項１２】請求項１０または１１に記載のターミナルであって，さらに前記デジタルクーポン情報の前記前提条件が満足されたか否かを決定するべく前記ターミナルの使用パターンをモニターするためのモニター手段から成り，前記使用パターンは，(a)いずれの少なくとも一つの前記第１の特定の番組サービスが前記選択されたターミナルによって回復されたか，及び(b)少なくとも一つの前記第１の特定の番組サービスが前記ターミナルによって回復されたその間の時間間隔，の少なくとも一つの指標であり，前記デジタルクーポン情報の前記前提条件と前記使用パターンとの間に相関関係が存在するとき，前記クレジットが与えられる，ところのターミナル。

【請求項１３】請求項１２に記載のターミナルであって，前記番組サービスの前記第１の特定の番組は，前記ターミナルによって個別に回復されるよう適応される複数の個別番組を与え，前記使用パターンは前記ターミナルが，(a)前記複数の個別番組の所定の数，及び(b)少なくとも一つの前記個別番組を回復する際に前記ターミナルによって負う所定の料金額，の少なくとも一つを回復したことを示すとき，前記クレジットが与えられる，ところのターミナル。

【請求項１４】請求項１２に記載のターミナルであって，さらに前記モニター手段からの前記使用パターンを示す情報を通信リンクを通じて使用パターン会計センターへ通信するための通信インターフェースであって，前記制御器に作働的に関連するところの通信インターフェースと，から成り
前記制御器は，前記デジタルクーポン情報の前記ターミナルへの伝達を制御するために，前記使用パターンを示す前記情報を前記会計センターから受信する，ところのターミナル。
【請求項１５】請求項１０から１４のいずれかに記載のターミナルであって，さらに前記ターミナルがユーザー入力に従って前記クレジットを選択的に買い戻すことができるようにするためのユーザーインターフェースに応答する手段，から成るターミナル。
【請求項１６】請求項１０から１５のいずれかに記載のターミナルであって，前記ターミナルが前記番組サービスの前記第１の特定の番組を回復する時，ユーザーインボルブメントの確認を得るための，ユーザーインターフェースに応答する手段，から成るターミナル。
【請求項１７】請求項１０から１６のいずれかに記載のターミナルであって，前記デジタルクーポン情報及び前記番組サービスは共通の暗号キーに従って，暗号化される，ところのターミナル。
【請求項１８】請求項１０から１７のいずれかに記載のターミナルであって，さらに前記デジタルクーポン情報を暗号学的に認証するための認証手段と，から成るターミナル。
【請求項１９】請求項１８に記載のターミナルであって，前記認証手段はグループキーに従って前記デジタルクーポン情報を認証する，ところのターミナル。
【請求項２０】請求項１８または１９に記載のターミナルであって，前記認証手段はパブリックキーに従って前記デジタルクーポン情報を認証する，ところのターミナル。
【請求項２１】請求項１０から２０のいずれかに記載のターミナルであって，前記番組サービスは付随する番組reキーに従って暗号化された番組を含み，特定の少なくとも一つの前記番組reキーは前記ターミナルに通信され，それによって前記ターミナルは前記番組reキーを使って付随する番組を解読しかつ回復することができ，前記デジタルクーポン情報は，前記番組reキーとともに前記ターミナルへ通信される，ところのターミナル。
【請求項２２】通信チャネルを通じて通信ネットワーク内で制御器から複数の加入者ターミナルまでデジタルクーポン情報を送信する方法であり，前記ネットワークは番組サービスを前記制御器から前記複数の加入者ターミナルへ通信するためにも使用され，前記番組サービスは前記加入者ターミナルによって選択的に回復されるよう適応される，ところの方法であって，前記デジタルクーポン情報を受信するべく，選択された少なくとも一つの前記ターミナルを目標にする工程と，前記通信チャネルを通じて前記デジタルクーポン情報を前記ターミナルへ伝達する工程と，前記デジタルクーポン情報によって前記ターミナルは，前記デジタルクーポン情報の前提条件に従って前記番組サービスの第１の特定の番組を回復する時にクレジットを得ることができる工程と，前記ターミナルにおいて得られた前記クレジットのランニングバランスを保持する工程と，から成る方法。
【請求項２３】請求項２２に記載の方法であって，前記クレジットは，前記番組サービスの第２の特定の番組を減額された料金で得る際に使用することができる，ところの方法。
【請求項２４】請求項２２または２３に記載の方法であって，さらに前記デジタルクーポン情報の前記前提条件が満足されているか否かを決定するべく前記ターミナルの選択されたひとつの使用パターンをモニターする工程と，前記使用パターンは，(a)いずれの少なくとも一つの前記第１の特定の番組サービスが前記選択されたターミナルによって回復されたか，及び(b)少なくとも一つの前記第１の特定の番組サービスが前記選択されたターミナルによって回復されたその間の時間間隔，の少なくとも一つの指標である工程と，前記デジタルクーポン情報の前記前提条件と前記使用パターンとの間に相関関係が存在するとき，前記クレジットを与える工程と，から成る方法。
【請求項２５】請求項２４に記載の方法であって，前記番組サービスの前記第１の特定の番組は，前記選択されたターミナルによって個別に回復されるよう適応される複数の個別番組を与え，当該方法がさらに，前記使用パターンは前記選択されたターミナルが，(a)前記複数の個別番組の所定の数，及び(b)少なくとも一つの前記個別番組を回復する際に前記選択されたターミナルによって負う所定の料金額，の少なくとも一つを回復したことを示すとき，前記クレジットを与える工程と，から成る方法。
【請求項２６】請求項２４または２５に記載の方法であって，さらに前記選択されたターミナルの前記使用パターンを示す情報を通信リンクを通じて前記モニター手段から受信する工程と，前記使用パターンを示す前記情報に従って前記選択されたターミナルへの前記デジタルクーポン情報の伝達を制御する工程と，から成る方法。
【請求項２７】請求項２２から２６のいずれかに記載の方法であって，さらにユーザー入力を前記ターミナルへ与える工程と，前記ユーザー入力に従って前記クレジットを選択的に買い戻す工程と，から成る方法。
【請求項２８】請求項２２から２７のいずれかに記載の方法であって，さらに前記ターミナルの対応するひとつが前記番組サービスの前記第１の特定の番組を回復するとき，ユーザーインボルブメントの確認を得る工程と，

から成る方法。
【請求項２９】請求項２２から２８のいずれかに記載の装置であって，さらに共通暗号キーに従って前記デジタルクーポン情報及び前記番組サービスを暗号化する工程と，から成る方法。
【請求項３０】請求項２２から２９のいずれかに記載の方法であって，前記複数の加入者のターミナルの異なるひとつに異なるデジタルクーポン情報を伝達する工程と，から成る方法。
【発明の詳細な説明】
【０００１】
【発明の属する技術分野】本発明は，ケーブルテレビ，衛星テレビのような通信ネットワーク，及びサービスが有料であるコンピュータネットワークに関する。特に，装置及び方法は，ペイテレビのようなサービスのユーザが特定の番組を観る際にクレジットが得られるようにするために与えられる。サービスプロバイダーは本発明によって，個別の加入者ターミナルに対し，“デジタル・クーポン”の形式でクレジット情報を送信することができ，その結果特定の番組をプロモーションして，報酬として視聴者にロイヤリティを支払う。
【０００２】
【従来の技術】ビデオサービスが有料であるケーブル及び衛星テレビネットワークが周知である。また同様に，周知なのは，CompuServe，Prodigy，America-online，Knight-Ridder情報サービスのようなコンピュータネットワークサービスであり，その他にデータベース，バンキング及びショッピングサービスにアクセスできるもの，e-mail及びその他で通信できるものがあり，すべて有料である。過去には，いくつかのネットワークは無料試験形式でサービスを提供していた。例えば，一日か二日の間続くプロモーションの時間間隔の間，例えば，映画若しくはスポーツチャネルのようなプレミアム番組は，そのような番組を受信するべく通常付加的な料金を支払わねばならない加入者によって視聴されてきた。最も多くの場合，これは，全サービスをある種のプロモートスクランブルモードで置き換えることによって実行され，そこでは，番組はスクランブルされていないか，すなわちきれいか，若しくはすべての加入者ターミナルに知られている固定キーを使用する。例えば，放送環境において，サービスプロバイダーは，現顧客若しくは潜在的な新規な客のいずれが特定のサービスにアクセスしようとしているかを知ることはできない。たとえ，電話回線若しくはある上流パスを使ってフィードバックが得られたとしても，サービスへの客の波長合わせの多くの処置によって，サービスプロバイダーは有用な分析ができない。
【０００３】結果として，しばしばサービスは，潜在的な新規の客及び現顧客若しくは少なくとも大きな定義されたグループを含むみんなによる，無料アクセスを許容するスクランブルモードに置かれなければならない。さらに，無料プレビューの間に有効にされる異なる番組が，異なる興味，大衆，及び視聴者の世代グループにアピールするため，無料サービス時間の延長はしばしば効果的にサービスをプロモーションするのに必要である。例えば，ある視聴者はアクション映画の方を観たいが，他の視聴者はコメディーを観たいかもしれない。従って，延長時間にわたって広大な無料番組を与えるべく，視聴者に対して付加的な月額用のプレミアム番組サービスに契約するよう効果的に勧めることが必要である。
【０００４】客は無料プレビュー間隔が終了するまでとにかく待って，続いて新しいサービスを注文するため，それがプロバイダーの予約センターのサービスの電話許容範囲を圧迫するため，無料プレビュー間隔の間は更新及び新規予約率は減少しさらに客を刺激する。
【０００５】付加的に，様々な番組は個別に若しくはアラカルトペイ・パー・ビューに基づいて提供されてもよく，その場合，加入者はひとつの番組を観るために料金を支払う。該客は客のターミナルに送られる一つの番組に対する特定の承認若しくは資格を有するよう，予約センターに電話をするか，または客は自分のターミナル内にダウンロードされた一定量の金銭クレジットを有するようアレンジしてもよい。ペイ・パー・ビュー(PPV)番組の選択とともに，ターミナル内に予め保存されたクレジット量は減少する。そのようなPPVは固定時間若しくはいわゆるNVOD(ニア・ビデオ・オン・デマンド)を有する揺れる時間(staggered times)において提供される。番組はまた本質的に同時にビデオ・オン・デマンド(VOD)で伝達される。
【０００６】VOD装置において，加入者がケーブルテレビ装置ヘッドエンドに配置されたビデオサーバーへ購入信号を通信したとき，番組は需要により特定の加入者に伝達される。該購入信号は例えば，ケーブルテレビネットワーク内の有効アップストリームチャネル，若しくは電話回線を通じて通信されてもよい。
【０００７】加入者に対しペイ・パー・ビュー番組の購入を勧めるさまざまな商業的テクニックが駆使されてきた。しばしばPPVは，サービスプロバイダーにとって予約サービスよりも有益である。加入者が所定の数のPPV番組を購入するとき，若しくは所定の量の金銭をPPV番組で消費したとき，これらのマーケティング技術は毎月の請求に基づいたクレジットを加入者に与える。さもなければ，加入者は，後に返送できるペーパー・クーポンをネットワーク経理部に郵送し，加入者が該クーポンを買い戻すための前提条件に一致した後，減額される。例えば，ひとつのPPV番組が通常の値段で購入されるとき，ペーパー・クーポンは加入者に対しPPV番組の２分の１の価格のクレジットの権利を与える。
【０００８】
【発明が解決しようとする課題】そのようなマーケティ

ング技術は有効であるが，ある加入者はペーパークーポン及び自身の毎月の請求書の他の減額を受け取るのに慣らされてしまい，その減額が提供されなければより高い料金の支払いに抵抗する。言い換えれば，彼らはクーポンを手に入れれば必ず買うのである。それらがいくつかの所定の条件に一致した後に加入者に報酬を与えることが所望される。付加的に，全サービスを無料にすることなく，加入者のグループ若しくは個人的加入者を選択的にターゲットにすること，またはそのようなプロモーションの効果をモニターすることは容易ではない。さらにまた，支払いサイクルの遅延のために典型的に多くの週の間，加入者による減額の実現が遅延するために，従来のプロモーションの効果は減少される。さらに，ペーパークーポンはまとめたり扱うのが困難であり，かつ簡単に紛失する。

【０００９】従って，サービスを無料化モードに置くことなく，若しくはペーパークーポンを使用することなく，特定の加入者若しくは加入者のグループに対して番組サービスのプロモーションの選択的目標を与えるための方法及び装置を与えることが所望される。所定の視覚パターンが一致したとき，装置によって加入者は早くクレジット受け取ることができなければならない。該装置は加入者に報酬ロイヤリティを与えかつ，PPV番組及び／またはプレミアム番組サービスのような付加的なレベルの番組サービスの購入を加入者に勧めなければならない。

【００１０】当該装置はまた加入者が素早く在庫目録を作成できる方法でクレジットをまとめなければならず，プロモーションを通じてサービスが有効であるときを加入者に知らせなければならない。当該装置は例えば，クレジットがさまざまなショー，番組がアクセスされる日時についてどのように使用されるかに関して柔軟でなければならない。

【００１１】さらにまた，そのようなプロモーションの連続をモニターするための装置を与えること，加入者が視聴している習慣のフィードバックを得ること，及び特定の番組のビュワーシップ(viewership)（例えば，観衆のサイズ）を決定することが所望される。当該装置は，違法に得るために装置をいじり回そうとする非許可者（例えば，パイレーツ）を妨害するべく暗号技術を採用しなければならない。

【００１２】本発明は上記及び他の利点を有する装置を与える。

【００１３】

【課題を解決するための手段】本発明に従って，ペイテレビのようなサービスのユーザーが特定の番組を観ている時にクレジットを得ることができるための装置及び方法を与える。本発明によって，番組サービスプロバイダーは，特定の番組をプロモートしかつ視聴者ロイヤリティを支払う“デジタルクーポン”の形式でクレジット情報を個別加入者のターミナルに送信することができる。

【００１４】本発明に従う通信装置は，通信チャネルを通じて複数の加入者ターミナルへ番組サービスを送信するための制御器を含む。番組サービスは，放送若しくは所定のスケジュールで連続的に送信されるテレビ番組，特定のユーザー選択及びローカルに若しくは自動的に実行される購入を要求するペイ・パー・ビュー番組，揺れる放送時間においてペイ・パー・ビュー提供されるニア・ビデオ・オン・デマンド，及びユーザーリクエストに応答してのみ送信されるビデオ・オン・デマンドサービス，または他のコンピュータソフトのような電気的情報を含んでもよい。

【００１５】通信チャネルはケーブルプラント及び／または衛星リンクを含むこともできる。該プログラムサービスは加入者ターミナルによって選択的に回復される。例えば，加入者は，電子番組ガイド（EPG)のようなオンスクリーンインターフェース，及びリモートコントロール装置を使って対応するチャネル内でチューニングすることによって，またはPPV若しくはビデオ・オン・デマンド番組のいずれかに対する購入注文を送信することよって，視聴するための特定の番組を選択することができる。

【００１６】該制御器は，周波数若しくは時間多重のようなあらゆる有効技術を使用して番組サービスデータに沿ったターミナルへデジタルクーポン情報を伝達する。デジタルクーポン情報の前提条件によって定義されるような特定番組を回復する時，該デジタルクーポン情報によって，ターミナルはクレジットを得ることができる。例えば，通常の値段で５つのPPV番組を購入する前提条件が一致したとき，加入者はひとつの無料PPV番組に対するクレジットを受け取ることもできる。ターミナルは，クーポンが与えられかつ買い戻されるに従い，自動的にクーポンクレジットのバランスをトラックする。クレジットは減額された料金で（例えば，ディスカウント若しくは無料）番組サービスを得る際に使用可能である。

【００１７】各ターミナルは，デジタルクーポン情報の前提条件が満足されていたか否かを決定するためにターミナルの使用パターン（例えば，視聴履歴）をモニターするプロセッサを含む。例えば，該使用パターンは，いずれの番組が，最近１月以内に，若しくは他の期間内に，または特定の番組若しくは番組サービス（例えば，チャネル）が観られた時間内に，ターミナルによって回復されたかを示す。該ターミナルはPPV番組の購入に基づいて，若しくはインフォマーシャル(infomercial)を観るのに費やす時間量に基づいて，クーポンを簡単に付与する。したがって，使用パターンとデジタルクーポン情報の前提条件との間に相関関係が存在するとき，クレジットは与えられる。

【００１８】グラフィック・ユーザー・インターフェー

ス（例えば，オンスクリーン・ディスプレイ）のようなユーザインターフェースは，加入者が選択的にクレジットを払い戻すことができるように与えられる。例えば，該ユーザーは，選択すべきさまざまなオプションを有し，この場合キャッシュバランス及び／またはクーポンバランスは完全に若しくは一部買い戻される。ユーザーインターフェースはまたユーザーインボルブメント(involvement)の確認を得るべく使用される。例えば，加入者がまだ番組を観ていることを検証するために，彼は周期的に，番組が表示されるに従いいくつかの制御入力信号を与えるよう要求されてもよい。

【００１９】番組サービスが，PPV手法に関するようなターミナルによって個別に回復される個別番組を含むとき，使用パターンが特定の数のそのような個別番組によって若しくは特定の量の料金によって回復されたことを示す場合に，該クーポンクレジットは，与えられる。これによって，クーポンクレジットはPPV番組がアクセスされたときはいつでも与えられる。番組にアクセスするためには，一つまたはそれ以上のクーポンが必要とされる。

【００２０】番組サービスプロバイダー及び広告者がターミナル使用データを獲得しかつ分析することを許容するために，ネットワーク制御器に付随する使用パターン会計センターが与えられる。該使用パターン会計センターは，番組サービスが送信されるところのチャネル内の上流パス，若しくは電話回線のような通信リンクを通じてターミナルからの使用パターンデータを受信することができる。特にこれは，番組内でadをランニングさせるコストがしばしば視聴率の関数であるところのコマーシャル若しくはインフォマーシャルのビュワーシップを決定するのに有用である。

【００２１】さらにまた，ネットワーク制御器はデジタルクーポン情報をターミナルに伝達するのを受信使用パターンデータに基づいて制御することができる。この場合において，ネットワーク制御器は，予約表題，PPV表題，及びクレジット情報のような他の表題と同様の方式でデジタルクーポンを直接ターミナルに伝達することができる。例えば，スポーツ番組用のプレファレンスを明示する加入者は将来のスペシャルスポーツ番組に対し減額を与えるデジタルクーポン情報を受信する。

【００２２】したがって該制御器は，使用パターンデータまたは他の手段によってコンパイルされた大衆若しくは個人データに基づいて異なる加入者に異なるデジタルクーポン情報を伝達する。該デジタルクーポン情報は，同一のクレジットを得るために異なる前提条件を与え，若しくは異なるクレジットを得るために同一の前提条件を与える。例えば，同一の視聴条件が一致したときに，比較的多くの番組を購入する優待加入者に対して他のより少ない優待加入者よりも多くのクーポンを与えることによって，優待加入者に報酬を与えることは可能である。

【００２３】不許可にデジタルクーポンへのアクセスを防止するためにさまざまな暗号技術が採用される。

【００２４】対応する加入者ターミナル及び方法もまた与えられる。

【００２５】

【発明の実施の形態】特定の番組を視聴中にペイテレビのような番組サービスのユーザーがクレジットを得ることができるようにするための方法及び装置に関する。本発明により番組サービスプロバイダーは，特定の番組をプロモートしかつ視聴ロイヤルティを認めるべく，“デジタルクーポン”形式でクレジット情報を個別加入者ターミナルに送信することができる。デジタルクーポンはサービスプロバイダーによって送られる基準に基づいてターミナル内でローカルに生成されることもでき，またはサービスプロバイダーによる表題として直接送信される。

【００２６】図１は本発明に従う通信装置のブロック図である。当該装置は送信エンド110，チャネル120，及び受信エンド130を含む。送信エンド110は，PPV注文処理機能115と連結する中央制御器130，ターミナルの使用パターンデータ会計機能125，暗号器／マルチプレクサ／変調器150，デジタルクーポン情報機能135，番組サービスデータ機能140，及び制御データ機能145を含む。

【００２７】受信エンド130は，ターミナル１からターミナルN(170)を含む多くのターミナルを有し，それらはハブ124及び経路122を通じて，デジタルクーポン情報，番組サービスデータ，及び制御データを受信する。各ターミナルは番組サービスデータを表示するためのテレビのような付随ディスプレイを有する。例えば，“ターミナルN”170はディスプレイ180に付随する。示された例において，ターミナル160，...，170はチャネル120を通じてPPV注文処理機能115及び使用パターンデータ会計機能125を連結することができる。

【００２８】例えば，ケーブルテレビネットワークにおいて，そのような上流通信は，プログラムサービスデータが通信されるチャネルから分離されたチャネル上（例えば，RFスペクトル）で与えられてもよい。周波数分割の多重化手法がこの目的を達成するために使用され得る。変形的に，時分割多重化手法が使用されるか，またはターミナル160，...，170は，電話回線のような分離通信リンクを通じてPPV注文機能115及び使用パターンデータ会計機能125と連結する。さらにまた，以下に詳細に説明されるように，本発明はPPV注文処理機能115及び／または使用パターンデータ会計機能125無しでも実行できる。

【００２９】チャネル120は，同軸ケーブル，光ファイバー，及び／または衛星若しくはRF放送リンクのようなワイヤレスリンクから成る。装置の送信エンド110は，例えば，ケーブルテレビ装置ヘッドエンド，衛星アップ

リンクセンター，若しくはRF放送センターであってもよい。

【００３０】デジタルクーポン情報機能135は，本発明に従ってデジタルクーポン情報を保存するためのメモリから成る。該デジタルクーポン情報は，装置の受信エンド130におけるターミナル160，...，170に連結されている。さらにまた，ターミナル160，...，170がアドレス可能であるとき，デジタルクーポン情報は，例えば大衆データに従って，個別ターミナル及び／またはターミナルのグループに対して目標にされる。変形的に，デジタクーポン情報は，番組サービスの経路から分離された経路を通じて送信される。

【００３１】デジタルクーポン情報はターミナルが多くの目的に使用することができるクレジットを与える。例えば，ターミナルが，PPV処理機能115を通じて一つ若しくそれ以上のPPV番組を注文するとき，デジタルクーポン情報は減額を与える。例として，もしターミナルが現請求サイクル内で５つのPPV番組を注文すると，デジタルクーポンクレジットによって，ターミナルは６番目のPPV番組を無料で注文することができる。さもなければ，PPV番組をまれに注文するターミナルに対しては，デジタルクーポンクレジットによって当該ターミナルは最初の番組を半額で注文することができる。デジタルクーポンは，サービスプロバイダーによって確立された番組クーポン基準に基づいて自動的に生成されてもよい。これの利点は，サービスプロバイダーを直接に巻き込む必要がないことである。また，これは回帰パスが存在しないか，遅いか，若しくは双方向処理に対してセットアップされていないところの放送環境に対して適している。

【００３２】変形的に，デジタルクーポン情報によって，ターミナルは減少した料金で若しくは無料でプレミアム番組サービスにアクセスすることができ，またはソフトウエア番組，コンピュータゲーム，電子形式の本，ミュージカル作品，オンスクリーンテレビ番組ガイド，映画若しくはレストランレビュー，または他のプロモーショナルで情報的で教育的な素材のような他の情報にアクセスすることができる。例えば，デジタルクーポン情報によって，ターミナルは，各PPV購入に関して２日間プレミアム映画チャネルにアクセスすることができ，また，一つのコンピュータビデオゲームをダウンロードすることもでき，またコンピュータデータベースへの無料接続時間を１時間得ることもできる。

【００３３】従ってここで使用される“番組サービス”の語は，テレビ，マルチメディア，及び他のオーディオ及び／またはビデオ信号，並びにターミナルによってアクセスされ若しくはチャネル120を通じて連結されるコンピュータソフトウエア若しくは仮想的なあらゆる情報を包含するものである。またここで“クレジット”の語は，ターミナルが，アクセス及び／またはチャネルを通じて番組サービスを得る時，減少しまたは放棄された価格のような利益を備えること，または他の手段（例えば，メール）によって加入者に配達されるチャネルを通じて商品を得るためのものである。

【００３４】ターミナル160，...，170は，ターミナルがある前提条件を満足するまで，デジタルクーポン情報で提供されるクレジットを換金しない。各ターミナルは，定義された時間間隔にわたってターミナルの使用パターンデータを定義するさまざまなファクターをモニターするための手段を有し，それは例えば，購入されたPPV番組の数，負荷されたPPV料金の量，どれくらいの時間で，ターミナルが特定の番組若しくは番組サービスに切り替わったか否か，ターミナルは一つ以上のプレミアム番組サービスに最近アップグレードされたか否か，及びプロモーショナル時間間隔は効果的であるか否かを含む。プロモーショナル時間間隔は，それらの新しい加入者のような個別ターミナルに，選択されたターミナル群に，またはすべてのターミナルに適用してもよい。

【００３５】したがって，ターミナル内のモニター手段は，ターミナルの使用パターンがデジタルクーポン情報の前提条件に対応するか否かを決定するために上記ファクターをモニターする。付加的に，“レポートバック”機能において，使用パターンデータは，例えば，ハブ124及びチャネル120，若しくは変形的に電話回線を通じて，ターミナルから使用パターンデータ会計機能125へ周期的に送信される。例えば，使用データは毎日，毎週，若しくは毎月送信される。

【００３６】そのような使用パターンデータは，よりよいターゲットの個別加入者及び加入者グループに使用される番組サービスプロバイダー及び広告者に対する有益な情報に，かれらが喜びそうな製品及びサービスを与える。さらにまた使用パターンはデータによって，利害関係人（例えば，プロモーター及び広告者）はさまざまなプロモーションの効果を決定することができる。例えば，デジタルクーポン情報がまれにPPVを注文する加入者に対し半額のPPV番組を与えれたとき，番組の成功率は機能125において使用パターンデータから決定される。

【００３７】他の例において，デジタルクーポン情報が多くの有効なプレミアム番組サービスのひとつに対し２日間の無料アクセスを与えるとき，選択されたプレミアム番組サービスはモニターされ，続いて加入者はデジタルクーポンを提供され，それによって彼は選択されたプレミアム番組サービスへ（例えば，最初の月のみ通常の半額で）アップグレードすることができる。さまざまな他の商業的戦略が収入及び客の信用を強化するために本発明に使用される。例えば，加入者は彼の誕生日に無料PPV映画クーポンクレジットが与えられる。

【００３８】さらに，デジタルクーポンバランスは，くじ，他のコンテストまたはゲームに従って調整される。

例えば，加入者はある量の金を使ってしまったとき，付加的クーポンで代用してくじに参加することができる。さもなければ，加入者は勝負がクーポンによって決定されるところの双方向ゲームを遊ぶ事もできる。

【００３９】しかし，たとえ使用パターンデータが機能125へレポートバックされなくとも，ターミナルのモニター手段は使用パターンデータがデジタルクーポン情報の前提条件と一致するか否かを決定することができる。好適にこれは，以下に詳細に説明するように，パイレーツによっていじり回されないように安全な方法で実行される。

【００４０】コントローラ130によって，機能135からのデジタルクーポン情報は，暗号器／MUX／変調器150において，機能140からの番組サービスデータ及び機能145からの制御データに沿って暗号化されかつ多重化される。プログラムサービスデータは保存媒体に局所的に保存され，及び／または衛星ダウンリンクのような外部ソースから受信されるビデオ及び／またはオーディオデータから成る。変形的に，該プログラムサービスデータはコンピュータソフトウエアまたは他の電子情報から成る。

【００４１】制御データは，受信データを復合化するために，ターミナルにおいてワーキングキーを生成するために使用される暗号化データを含む。典型的に，一つまたはそれ以上のプレミアム番組サービスはチャネル120を通じてベーシック番組サービスと連結される。ベーシック及びプレミアム番組サービスの両者は，適正なグループキー若しくは複数キーの所有によってアクセスされる。グループキー若しくは複数キーは表題マネジメントメッセージ(EMM)の一部として伝達される。適切な表題制御データに沿ったグループキー若しくは複数キーの所有により，ターミナルは，表題制御メッセージ(ECM)内に与えられるサービスプロバイダによって送られる番組データからの番組キーを回復することができる。

【００４２】番組キーによって，使用されるワーキングキーの解読若しくは誘導はアップリンク若しくはヘッドエンドサイドにおいて番組信号を暗号化することができ，またはダウンリンク若しくは客のデコーダサイドの番組信号を解読することができる。“回復”の語は，ここでは番組サービスが，加入者により使用（例えば，ディスプレイ）するようターミナルにおいて受信されかつ検索されることを示している。

【００４３】表題制御メッセージ(ECM)内に含まれる制御データは，特定の番組サービス（すなわち，チャネル）へのアクセスを制御するために使用される。該ECM制御データは，特定の番組サービスにアクセスしかつ回復するよう許可されるために，表題はターミナルにより保持される必要があることを示す。典型的に，制御データ情報を伝達するECMメッセージは番組キー情報を伝達するのにも使用される。したがって，ECMメッセージは番組パラメータを定義するだけでなく，キー若しくは先行キー（例えば，プレ-キー）も伝達する。

【００４４】該ECM制御データはさらに，ターミナルに対しPPV番組を注文するためのコストを与えるためのデータを含んでも良い。さらにこの制御データは，番組にアクセスするのに必要なクーポンの数及びタイプによって，減額にはいくつのクーポンが必要であるかをリストするその他の詳細に沿って，コストを指示してもよい。

【００４５】図２は，本発明に従う加入者ターミナルのブロック図である。図１と同じエレメントには同じ符号が使用されている。ターミナル170のデマルチプレクサ／デモジュレータ205は番組サービスデータ，デジタルクーポン情報，及び経路122及びハブ124からの制御データを受信する。デマルチプレキシング及びデモジュレーティングは従来技術を使用して実行される。暗号化された番組サービスはライン210及び214を通じて解読プロセッサ212及びスイッチ218にそれぞれ与えられ，一方，暗号化された制御データ及びデジタルクーポン情報は，ライン230を通じて保護プロセッサ220へ与えられる。

【００４６】暗号化された番組サービスは解読プロセッサ212によって解読され，解読プロセッサの出力216においてクリアな信号を与える。保護プロセッサ220は解読プロセッサ212から解読されたデジタルクーポン情報を受信してもよい。解読プロセッサ212は従来の解読手法を利用する。例えば，Gilhousenらによる米国特許第4,613,901号の題名"Signal Encryption and Distribution System for Controlling Scrambling and Selective Remote Descrambling Television Singnals"，またはBennett らによる，米国特許第4,864,615号の題名"Reproduction of SecureKeys By Using Destributed Key Generation Data "がここに参考文献として組み込まれる。

【００４７】解読プロセッサはライン210を通じてそこへ入力された信号を解読するべくワーキングキー(WK)を必要とする。該ワーキングキーはライン230を通じて受信された制御信号に応答して保護プロセッサ220よって生成される。保護プロセッサ用のファームウエアは読み取り専用メモリ(ROM)224内に保存されている。保護プロセッサ220はまたランダム・アクセス・メモリ(RAM)を備える。RAM222の保護部分は，後に図３との関連で詳しく説明されるように，単体の特定キー及び/または毎月グループキーの解読で使用するシード(seeds)を保持する。

【００４８】ユーザーインターフェース226によって，視聴者はテレビ180を観ている間に，番組を選択できる。もし，ユーザーが加入者，個別購入（例えば，ペイ・パー・ビュー），デジタルクーポンクレジットにより選択されたサービスを受信することを許可されれば，保護プロセッサ220は解読プロセッサ212からの解読された出力216をユーザーインターフェース226を通じてテレビ180と接続するようにスイッチ218を作動させる。そうでなければ，ユーザーインターフェース及びテレビはライ

ン214及びスイッチ218を通じて暗号化された信号を受信するのみである。当業者に周知のように，スイッチ218は，ユーザーにバーカー(barker)チャネル（例えば，固定メッセージ）を与えるか，ユーザーが選択したサービスへのアクセスを許可されない場合には信号を全く与えないように交互に構成されている。

【００４９】保護プロセッサ220は，ユーザーがデジタルクーポンクレジットを得るために前提条件に一致するか否かを決定するべく，ユーザーインターフェース226を通じてユーザーによって選択された番組をモニターする。例えば，もし，５つのPPVが通常価格で購入されたときデジタルクーポンがひとつの無料PPV番組に対してクレジットを与えるならば，保護プロセッサはPPV番組の購入の発生を記録する。RAM222は対応するデータを保存するために使用される。従って，使用パターンデータはデジタルクーポン前提条件に関係するデータを含むが，他のユーザー選択も同様に含むことができる。データモデムのような通信インターフェース230が与えられ，ターミナルはVOD番組用の注文，または取り込むためにサービスプロバイダーの許可を必要とするある種のタイプの番組を図１のPPV注文処理機能115へ送信することができる。ターミナルによって局所的に処理され及び内部的にターミナルに保存されたPPV購入は，請求書用にPPV処理機能へ発送される。インターフェース230によって，ターミナル170は使用パターンデータを図１の使用パターンデータ会計機能125へ送信できる。

【００５０】ターミナルは，ターミナル170に対して最初のカレンシ(currency)クレジットバランスを与える表題マネジメントメッセージ(EMM)の形式で制御データを受信する。この場合，ユーザーがPPV番組を注文するとき，すべてのカレンシクレジットバランスは番組のコストだけ減少する。サービスプロバイダーから生じるEEMメッセージは初期の若しくは付加的なクーポンクレジットをターミナルへ伝達してもしなくてもよい。

【００５１】典型的に，デジタルクーポンクレジットを得るための前提条件が実現したとき，クーポンクレジットは生成される。クーポンクレジットバランスは直ぐに調節される。示されるように，初期のクレジットバランスが４０ドルだとすると，各PPV番組のコストは５ドルである。したがって，最初の５つの番組が購入された後，クレジットバランスは連続的に＄35，＄30，＄25，＄20，及び＄15へと下降する。このとき，使用パターンデータはデジタルクーポン情報の前提条件に一致し，クーポンクレジットバランスはひとつ増分される。

【００５２】変形的に，クーポンクレジットバランスは各PPV購入に関してひとつだけ増分される。ターミナルが６番目の番組へ同調されるとき，ターミナルは番組用の表題制御メッセージ(ECM)を受信する。ターミナルは，番組がアクセスされるであろう異なる方法を決定するためにECMを使用する。もし，番組がクーポンによって有効であれば，ECMはカレンシコスト及びクーポンコストを記述する。ターミナルは自動的に当該ターミナルがクーポンを有するが否かを決定する。もし有すれば，番組は自動的に視聴者に提供され，または視聴者はカレンシ若しくはクーポンを使って番組の購入を促される。

【００５３】クーポンオプションを選択することによって，PPV番組用の次の注文は無料で与えられ，クーポンクレジットフィールドは適宜減分される。したがって，バランスは＄15のままである。変形的に，ターミナルが６番目の番組に対してチャージされても，保護プロセッサはコスト分だけクレジットバランスを増分させ，その結果クレジットバランス内にネットの変化は生じない。保護プロセッサはユーザーインタフェース226上のディスプレイを与え，それは視聴者に対しデジタルクーポン情報の前提条件が一致したことを知らせる。もちろん，対応する前提条件が一致するときクーポンクレジットに対して蓄積することも可能であるが，クレジットは換金されない。クレジットは２，３月の所定の時間間隔の間または若しくは無期限にターミナル内で保持される。

【００５４】さらに図４～６との関連で詳細に説明されるように，視聴者は他の関連情報に沿ってクレジットバランスを決定するためにユーザーインターフェース226を疑ってもよい。

【００５５】図３は本発明に従って使用するための解読段階を示すブロック図である。暗号化された番組プレキーはターミナル340を介して，また毎月グループキーはターミナル342を通じて受信され解読機能344へ入力される。番組プレキーは，解読に対して有効な暗号化された提供番組（例えば，テレビ番組）それぞれに対して特定のものである。グループキーは周期的に，例えば，月に一回変化する。解読機能344は暗号化された番組プレキーを解読し，一方向機能348へのひとつの入力として使用される番組プレキーを与える。その他の一方向機能348への入力はさまざまな番組及びクーポン属性から成り，それは対応する番組に対するクーポン及びカレンシコストのようなアクセス要求を含む。該アクセス要求は番組を観るための許可を得るべく一致しなければならない。番組及びクーポン属性はターミナル346を通じて入力され，一方向機能は番組キーを得るべく番組プレキー及び番組属性を処理する。

【００５６】一方向機能348から出力される番組キーは，ターミナル350を通じて時間を表す初期化ベクトル(IV)を受信する他の一方向機能352への一つの入力として使用される。一方向機能352による初期化ベクトル及び番組キーの処理は，許可されたユーザーによって選択された番組サービスを解読するために図２の解読プロセッサ212によって要求されるワーキングキーを生成する。ワーキングキー（“キーストリーム”内で与えられる）を含む，さまざまなキーの生成の詳細は，上記Bennettらの特許に示されている。

【００５７】付加的に，デジタルクーポン情報及び番組サービスは共通の暗号キーに従って暗号化される。これによって，クーポンイメージを表す認証されたファイルがデコーダへ送信されることができる。該クーポンは，クーポンをデコーダから番組サービスプロバイダーへ若しくは他の会計センターへ送信することによって，後で認証されたイメージとして買い戻される。

【００５８】図４は，本発明に従うユーザーインターフェース用のオンスクリーンディスプレイである。ディスプレイ400は，ユーザーがチャンネルを選択しかつボリューム等を制御することができるグラフィカル・ユーザー・インターフェース(GUI)の一部として呼び出される。そのようなインターフェースは周知技術である。ディスプレイ400は，携帯リモートコントロール，矢印デバイス，ボイスコマンド若しくはその他の有用手段によって制御される。例えば，ユーザーは，ディスプレイ400に出現させるグラフィカル・ユーザー・インターフェースからの映画のようなPPV番組を選択してもよい。

【００５９】ディスプレイ400は，自分が現在選択した番組の加入者ではないことをユーザーに知らせるフィールド410を含む。すなわち，ユーザーは番組を注文しなければならない。フィールド420は，ユーザーに対し自分が番組注文の際に異なるオプションを有することを知らせる。フィールド430～460はオプションを与える。フィールド440は，映画が，有効なキャッシュクレジットバランスから差し引かれているコストを有するインパルス・ペイ・パー・ビュー(IPPV)番組として購入されるところの第１オプションを与える。したがってユーザーは，映画のキャッシュコスト及び有効なキャッシュクレジットバランスを知らされる。番組は十分なキャッシュクレジットバランスが存在する限り購入される。

【００６０】フィールド450は第２のオプションを与え，そこでは番組はデジタルクーポンのみを使って購入される。ユーザーは映画のクーポンコスト及び有効なクーポンクレジットバランスを知らされる。番組は，十分なクーポンクレジットバランスが存在する限り購入される。デジタルクーポンはここでは"TV"クーポンと呼ばれる。

【００６１】フィールド460は第３のオプションを与え，そこでは番組はキャッシュ及びデジタルクーポンの組み合わせを使用して購入される。ユーザーはクーポン及びキャッシュの両方を使用する映画のコスト並びに有効なキャッシュクレジットバランス及びクーポンクレジットバランスを知らされる。たったひとつのキャッシュ/クーポン組み合わせがフィールド460に与えられるが，他の組み合わせもまた与えられることがわかるだろう。実際，クーポンはこの目的のためにキャッシュの価値が割り当てられる。

【００６２】他のオプションにおいて，図示されないが，もし加入者が，他の方法で存在しないコマーシャルメッセージを出現させようとすれば，加入者は減額のためにPPV番組を注文する。例えば，テレテキストを使用するコマーシャルメッセージはPPV映画を観ている時スクリーンの下部分に現れる。若しくは，VODに関して，減額された番組が選択された時，選択されたPPV映画は周期的なコマーシャルメッセージブレイクを有するが，さもなければコマーシャルは与えられない。

【００６３】図５は本発明に従うユーザーインターフェース用の他のオンスクリーンディスプレイである。ここで，ディスプレイ500は，異なるチャネルを視聴しながら蓄積されたクーポンクレジットの数の情報を与える。例えば，さまざまな番組サービスプロバイダーは，視聴者に対し一週間に観たサービスプロバイダーの時間数及び/またはどの番組を観たのかに基づいてクーポンを与える。

【００６４】フィールド510及び530はさまざまな番組サービスプロバイダーをリストアップし，一方フィールド520及び540は蓄積されたクーポンクレジットの数をリストアップする。例えば，サービスプロバイダーのホーム・ボックス・オフィス(HBO)に対して，４つのクーポンのバランスが存在する。この方法において，番組サービスプロバイダーは，ビュアーシップを刺激するべく競争する。例えば，新しい番組が始まるときに，付加的なクーポンが与えられてもよい。さらにまた，クーポンは番組が視聴される一日の時間若しくは一週間の日に基づいて蓄積されることができる。さらに，普通に支払われた番組サービスプロバイダーはかれらの番組のビュアーシップを刺激するためにクーポンを与える。

【００６５】図６はさらに本発明に従うユーザーインターフェース用の他のオンスクリーンディスプレイである。ディスプレイ600は，加入者が本発明に従うデジタルクーポンを使って選択するところのさまざまなアイテムの例を与える。さらに，他の利害関係人に沿ったそれぞれの番組サービスプロバイダーは自分のアイテムを提供する。フィールド610は，特定のディスプレイ600は，サービスプロバイダーのケーブル・ニュース・ネットワーク(CNN)のそれであることを示している。フィールド620はカレントのクーポンクレジットバランスを示し，一方，フィールド630は得られるアイテムを示し，フィールド640は各アイテムを得るのに必要なクーポンの数を示す。

【００６６】従って，ユーザーは非常にさまざまなアイテム用のデジタルクーポンを買い戻すことができ，例えば，ターミナルによってアクセスされ若しくはそれに通信される付加的な番組並びにメールによってユーザーの家庭に配達される非番組アイテムを含む。

【００６７】いくつかのアイテムはデジタルクーポンを全く必要としない。例えば，フィールド650は加入者のターミナルへ通信され若しくは加入者の家庭に無料で配達される製品情報を記述する。しかし，加入者が製品情

報を要求するとき，使用パターンデータは更新され，また商業目的で使用される図１の使用パターンデータ会計機能125へ続けて与えられる。

【００６８】図７は本発明に従うデジタルクーポンを与えるための方法を示すフローチャートである。該フローチャートは実施例を示し，そこでは最初のキャッシュクレジットバランスが月に一度の基準でターミナルへ与えられる。したがって，ユーザーが付随するコストを有するPPV番組のような番組を観たいと所望したとき，そのコストはキャッシュクレジットバランスから差し引かれる。さらに，ユーザーが使用パターンデータによって決定されるようなデジタルクーポン情報の前提条件に一致するとき，クーポンクレジットバランスは蓄積される。該クーポンクレジットバランスは付加的な番組サービスをキャッシュの代わりに購入するために，または付加的にすでに購入された番組のコストを支払うのに使用される。後者の場合，クーポンクレジットはキャッシュ価値が割り当てられる。

【００６９】ブロック705において，送信機の制御器はターミナルへ初期キャッシュクレジットバランスを伝達する。各ターミナルに伝達された量は，それぞれ異なり，例えば，過去の購入の習慣に基づいて為される。ブロック710において，制御器はデジタルクーポン情報をターミナルへ伝達する。再び，異なるターミナルは大衆ファクタなどに従って異なるクーポンデータを受信してもよい。ブロック720において，ターミナル使用パターンがモニターされかつ記録される。特に，デジタルクーポンの前提条件に一致するイベントは記録され，一方ユーザー習慣を示す他のデータもまた記録される。

【００７０】デジタルクーポン前提条件は，加入者が与えられた数のPPV番組を最近のM日間（ブロック722）で購入したか否かのようなさまざまなイベントを記述する。その場合デジタルクーポンクレジット"1"がブロック724で与えられる。異なるタイプ及び量のクーポンは視聴者が一致する特定の前提条件に従って与えられる。例えば，あるクーポンクレジットはほかのより価値があり，若しくは異なる利益で買い戻される。

【００７１】ブロック726において，もし加入者が最近のY日間にPPV番組のX$を購入したことが決定されると，デジタルクーポンクレジット"2"はブロック728で与えられる。ブロック730において，もし加入者がZ分の間に“インフォマーシャル”を視聴したら，デジタルクーポン"3"はブロック732に与えられる。“インフォマーシャル”は，例えば，２分の１時間若しくはそれ以上の標準番組の長さ及びフォーマットを有するコマーシャルメッセージであり，また概して比較的少ない聴衆を得る。商業的目的のために，たとえ番組を観るために負うべき料金がない場合であっても，視聴者に視聴インフォマーシャルを与えることが所望される。付加的に，クーポンクレジットは番組の最初の視聴に対してのみ与えられ，その結果付加的クーポンクレジットは同一番組の再視聴に対しては与えられない。

【００７２】ブロック734において，もし加入者がベーシック番組階層からプレミアム番組階層，若しくはより高いプレミアム番組階層へアップグレードされたら，デジタルクーポン"4"がブロック736に与えられる。ブロック738において，もしプロモーショナル時間間隔が進行中であれば，デジタルクーポン"5"はブロック740に与えられる。そのようなプロモーショナル時間間隔は概してすべての加入者に適用される。

【００７３】ブロック750において，クーポンクレジットの総量が決定される。ブロック760において，もしクーポンクレジットバランスがゼロ以上であれば，ブロック770において，ユーザーはユーザーインターフェース（例えば，テレビがついている時はいつも）によって，デジタルクーポンを買い戻す際に有効なさまざまなオプションの中から選択することを促される。例えば，加入者は減額若しくは料金無しに対するPPV番組を注文し，所定の時間間隔の間にプレミアム番組にアクセスし，または単純にパスして他の時間に有効オプションを使用する。さまざまなオプションは図４～６との関係で詳細に説明されてきた。上記された周期的プロンプトに加えて，ユーザーはリモートコントロールを通じていつでもクーポン買い戻しメニューにアクセスすることができるようになる。

【００７４】ブロック780において，デジタルクーポンバランスはブロック770において買い戻されたクーポンの数によって調節され，ターミナル使用パターンのモニターはブロック720で続けられる。

【００７５】ある種の加入者インボルブメントを要求することによってユーザーが特定の番組を実際に視聴していることを立証することは可能である。例えば，加入者がZ分間にインフォマーシャルを観たことを立証するために，ターミナルは加入者に対しユーザーインターフェースへコマンドを入力することを要求する。該ユーザーインターフェースは"Do you wish to continue"のようなメッセージを与え，加入者はデジタルクーポン前提条件に一致させるべくそれに対して応答しなければならない。ターミナルの内部タイマーは応答が受信されるまで停止される。

【００７６】情報等を視聴する加入者に対して，番組ごとにただ一つのセットのクーポンが与えられることを保証するために，図３で以下に説明されるようなCOUPON_RECORD_DURATIONフィールドは，情報の番組記録がターミナル内に保存されるところの時間間隔を示すべく与えられる。これは，繰り返し使用されるべきインフォマーシャルに対する同一の番組IDをいまだ可能にしながら，同一の加入者が，繰り返し流れる同一のインフォマーシャル用のクーポンを再度入手するのを妨げる。

【００７７】本発明に従う上記データ伝達シンタックス

が以下の表１～４に記載されている。表１～３はそれぞれ，デジタルクーポンが，EMM，IPPV ECM購入リンク，及び番組reキーECMを使ってターミナルへ伝達されたときに使用されるデータフィールドを説明している。表４は，すべての伝達方法で使用されるデータフィールドを説明する。図示されたシンタックスは図示のためだけのものであって，他のデータ伝達手法と交替可能である。

【表１】

シンタックス	サイズ	説明
COUPON_PROVIDER_ID	3バイト	クーポンスポンサーの識別
NEW_COUPON_CREDIT	3バイト	一か月のサービスプロバイダー用のクーポンの絶対数
NEW_COUPON_DEBIT	3バイト	一か月のサービスプロバイダー用の絶対借方
COUPON_CREDIT	3バイト	合計蓄積クーポン数
COUPON_SEQ_NUMBER	1バイト	クーポン伝達のエポック（時間間隔）

【表２】

シンタックス	サイズ	説明
COUPON_PROVIDER_ID	3バイト	クーポンスポンサーの識別
COUPON_CREDIT	1バイト	残りクーポン数

【表３】

シンタックス	サイズ	説明
COUPON_ID	2バイト	COUPON_ID+ COUPON_PROVIDER_ID= 単一クーポンID)
COUPON_PAYOUT_DURATION	2バイト	クーポンクレジットを得るために加入者が番組を見なければならない時間間隔
COUPON_RECORD_DURATION	3バイト	クーポンがターミナル内で保持される時間間隔
COUPON_PROVIDER_ID	3バイト	クーポンスポンサーの識別

【表４】

シンタックス	サイズ	説明
COUPON_DEBIT	2バイト	蓄積されたクーポン借方の数
COUPON_PACKAGE_ID	2バイト	パッケージ番組用のクーポンのタイプ
IPPV_CREDIT	2バイト	ペイ-パー-ビュー用のキャッシュクレジットバランス
PACKAGE_PROVIDER_ID	2バイト	パッケージ番組のサービスプロバイダーの識別
PKG_COST	1バイト	パッケージ番組用のキャッシュチャージ
PKG_ID	1バイト	パッケージの識別
PROGRAM_PAYOUT_DURATION	1バイト	クレジットを得るために加入者が視聴しなければならない番組の最小時間
PROGRAM_INFORMATION	2バイト	番組のビデオ/オーディオデータ
SHOW_COUNT	2バイト	購入されたショーの数
VH_LIMIT	2バイト	レポートバックが強制される前の視聴履歴限界
COUPON_PROVIDER_ID	2バイト	サービスプロバイダーの識別

【００７８】著作権侵害を妨害するために，デジタルクーポンは，リポートバックが存在するところの確立されたインパルスPPV会計を加入者に提供するのみである。例えば，これは，グループreキーEMM若しくは番組reキーECMのいずれかのフラッグとしてビットを使用することによって有効となる。

【００７９】図１の使用パターンデータ会計機能125との関係で上記されたレポートバック特徴によって，番組サービスプロバイダー及びネットワーク制御器は異なる番組に対する聴衆サイズをモニターすることができる。したがってデジタルクーポンの使用により，サービスプロバイダーは，プレミアムショーでない番組の大きな断面にわたってビュワーシップパターンを検出することができる。言い換えれば，PPVにより有効でないショーはクーポンにより有効にされるかもしれない。

【００８０】以下の番組伝達シナリオにおいて，クーポンで購入できる実チャネル（すなわち番組）は存在しなければならないことが仮定されている。これは以下に説明されるように番組キーを生成するべく番組情報をハッシングすることによって実施され得る。したがって，もし実際にクーポンホルダに提供されなければ，番組はデジタルクーポンを使って視聴される。

【００８１】しかし，パイレーツはクーポンの伝達をいじり回そうとする。パイレーツの主な目的は，偽メッセージ（例えば，“だまし”）を与えることによって装置を破ることにあり，その結果あらゆるクーポン前提条件を実行することなくデジタルクーポンを得る。本発明にしたがって，COUPON_CREDITフィールドを安全にターミナルへ伝達する他の方法が議論される。

【００８２】デジタルクーポンを伝達するには，グループreキーEMM，IPPV購入リンク，または番組reキーECMを使用する３つの方法がある。グループreキーメッセージ技術はクーポンを一般の母集団ターミナルへ分配することをあつかい，同時にIPPV購入へのリンクされる方法を与える。しかしIPPV購入リンクはグループreキーメッセージ伝達から独立に為される。番組クーポンreキー技術に関して，ネットワーク制御器若しくはPPV注文処理センターは，ターミナルによってクーポンが内部的に生成されるところの方法を使って，いくつのクーポンを加入者は受けるのかを知らないために，グループreキーメッセージを通じたクーポンの伝達は相互に番組reキー技術から排他的である。したがって，もし，クーポンに基づいたグループreキーがクーポンに基づいた番組reキーから別々にトラックされなければ，クーポンに基づいたグ

ループpreキーの管理はターミナル内部で安全に扱うことができない。

【００８３】グループpreキー表題マネージメントメッセージ(EMM)を通じたクーポンの直接の伝達は，加入者へクーポンを伝達する最も直接的方法である。このアプローチは，例えば，先に購入した量に基づいて，特定の加入者に報酬を与えるよう決定するIPPVサービスプロバイダーにたいして好適である。したがって，サービスプロバイダーはどの特定の加入者がデジタルクーポンを受け取るべきかを知り，したがって，単一の特定のEMMを各加入者へ向ける。

【００８４】付加的に，グループpreキーEMMのアプローチは，テキストメッセージコマーシャルをもたらす指示子に沿って加入者にデジタルクーポンを与えるのに適している。これらのオンスクリーン・ディスプレイは宣伝を運び，表示されたビデオ及びオーディオの頂部に置かれる。上記したように，これらの加入者は，他の番組に対する減額のようなデジタルクーポン利得を得るためにそのような広告を観ようとする。再び，サービスプロバイダーは，どの加入者が伝達されたテキストメッセージ広告を有するのに同意したかを正確に知り，したがって彼らにEMMを通じて対応するデジタルクーポンを与える。

【００８５】さらにまた，COUPON_CREDIT及びVH_LIMITデータフィールドを使用して，個別サービスプロバイダーはデジタルクーポンを個別加入者へ送る。各サービスプロバイダーは，フィールドVIDEO_PROVIDER_IDによって識別される。もし，パイレーツがグループキーメッセージを偽VIDEO_PROVIDER_ID及びCOUPON_CREDITと合成して，その結果誤ったグループキーを生成したら，パイレーツは偽VIDEO_PROVIDER_ID及びCOUPON_CREDITの対をターミナル内に作成することができる。

【００８６】上記問題のひとつの解は，EMM認証を使用して実行される。特に，もしグループpreキーEMMが送信衛星で使用されれば，それはハッシングされる。その後該ハッシングはサインを作成するために暗号化される。パイレーツは，ターミナルのユニットキー，及びキー階層の知識なく偽造グループpreキーEMMを生成することができない。この場合において，偽造メッセージは処理されずに拒絶される。メッセージを認証するための他の方法は，サイン若しくはすべてのメッセージを暗号化するためにパブリックキー暗号を使用することである。これはまた偽造メッセージの生成を妨げる。

【００８７】さらにまたパイレーツは，合法的に確立されたメッセージを使って“繰り返し”攻撃を使用する。この場合において，メッセージが最初に作られかつ新規なCOUPON_CREDITをターミナル内に作るためにまず使用された後に，合法的メッセージは保存されターミナルに毎月与えられる。これに対抗して保護するために，グループシーケンスナンバーが増分される。

【００８８】さらに，パイレーツは，メッセージが生成されたのと同じ月内でメッセージを繰り返そうとする。これに対抗して保護するために，新規なCOUPON_CREDITが特定の月の間にトラックされる。月末には，それが前月に儲けたCOUPON_CREDITへ付加される。COUPON_CREDIT_FIELDがグループpreキーEMMでその月の間中ターミナルへ送られているとき，それは特定のターミナルに対して発行された絶対的なクーポンクレジットである。さらに，その月の間特定のサービスプロバイダーからのクーポンを管理するために，付加的フィールドのCOUPON_DEBITはターミナル内に作成される。同月内の繰り返し攻撃に対抗する他の方法はEMMそれ自身を順に配列することである。そのとき，デコーダは新規メッセージと以前見たメッセージとの間の差異を認めることができる。他の方法はEMM内の日/時間パラメータを含むものである。シーケンス番号についてと同様に，このフィールドは前方へ行くか若しくは留まるかしかないが，過去の値に変更はされない。

【００８９】単にメッセージをサインすること若しくはパブリックキー暗号を使用することではそのような繰り返し攻撃を防止できないため，例えば，COUPON_CREDIT及びVH_LIMITフィールドのようなグループpreキーメッセージにおいては，各個別サービスプロバイダーに対して，新規COUPON_CREDITが認証されなければならない。さらに，各新規クーポン記録が生成されたときを指示するシーケンス番号をトラックしなければならない。グループキーエポックが発生すると，最初にクーポン記録を作るために使用されたグループpreキーEMMは，そのメッセージが古いため付加的なクーポンを作ることができない。そのとき，新規COUPON_CREDITは古いCOUPON_CREDITに付加される。もし，次月中にターミナルにクーポンが送られなかったら，かつすべての現存クーポンが使用されたら，そのときはすべてのクーポン記録は消去される。

【００９０】第２のデジタルクーポン伝達方法において，クーポンはIPPV購入リンクを通じて伝達される。各IPPV購入に関して，プログラムreキーメッセージ内のひとつのビットによって，サービスプロバイダーは，上記したグループpreキー方法のようにレポートバックを得るのを待つこともクーポンと一緒の“トリップ”を実行することもなく，ひとつまたはそれ以上のクーポンを自動的にかつ早急に加入者へ伝達できる。もし加入者が前の特定のサービスプロバイダーからのクーポンを全く持っていなかったなら，新しいサービスプロバイダークーポン記録が作成される。したがって，クーポン作成プロセスは，IPPV番組の実際の購入としっかりリンクされている。多くのクーポンが結果的に生じたとき，加入者はそれを買い戻すことができる。典型的に，サービスプロバイダーはそのサービスプロバイダーの番組に対してのみ買い戻しが可能なデジタルクーポンを提供する。しか

し，サービスプロバイダーのグループは，必要なら交換可能なクーポンを与えるべく提携することもできる。

【００９１】他のパイレーツの攻撃の可能性として，多くのIPPV番組を購入するようなデジタルクーポン前提条件を実行する時に与えられるクーポンの数を操作しようとするかもしれない。ひとつの可能な対策は暗号（例えば，サイン）を有するDESハッシュまたは番組reキーメッセージのパブリックキー暗号を使用することである。もしクーポンの数がIPPVレポートバックにおいて認証されていれば，このフィールドでのパイレーツの操作は誤った暗号フィールドを生じさせる。

【００９２】もし，パイレーツがグループキーを知っていれば，また視聴ヒストリー情報（例えば，使用パターンデータ）がクーポン地をハッシュするために使用され，かつレポートバック内で送られれば，偽造が生じうるが検出可能である。

【００９３】さらに，もしパブリックキー暗号が番組reキーメッセージの伝達で使用されたならば，たとえパイレーツがグループパブリックキーを知ったとしても，グループ個人キー知られていないのでメッセージは未だ合成されない。グループ暗号若しくは個人キーはターミナル内に存在しないため，パブリックキー暗号は秘密キー暗号に対して別個の利点を有する。結果として，VLSIプロービング及びその他のターミナルに対する攻撃はキーを示すことができない。

【００９４】本発明に従う第３の伝達方法において，“インフォマーシャル”として知られる拡張された商業番組と関連して分配される。好適には，加入者は特定の時間の間に番組を視聴した後にのみデジタルクーポンクレジットが与えられる。さらにまた，加入者が簡単に番組の変更及び切替ができないように，ユーザーインターフェースで要求される制御入力のようなある種の加入者困難を要求するのが有利である。

【００９５】パイレーツは，自動的に加入者困難制御信号を与えるため非保護プロセッサ内のコードを変更することもできる。しかし，番組が視聴された若しくは少なくとも調整された時間数は保護される。インフォマーシャルサービスプロバイダーは本質的に番組を視聴するよう加入者に支払っているのだから，これを実行するために，番組が続く最長時間をトラックする必要はない。PROGRAM_PAYOUT_DURATIONフィールドがカウントダウンタイマー内にロードされ，デジタルクーポン前提条件の最少視聴時間要件を強要する。従って，タイマーカウントダウンがゼロに成ったとき，及びインフォマーシャルチャネルが同調された時のタイマーカウントダウンのとき，クーポンが発行される。本質的に，これはターミナルをインフォマーシャルへ同調するようつなぎ留め，かつ他のチャネルの同調を妨害する。

【００９６】さらにまた，COUPON_RECORD_DURATIONフィールドは，番組記録が保護プロセッサメモリから消去される時を決定するのに要求される。

【００９７】パイレーツは，インフォマーシャルを視聴したときいくつのクーポンが与えられたかを示す，番組reキーECM内のフィールドを操作しようとする。ひとつの可能性は，DESハッシュ（例えば，サイン）若しくは番組reキーのパブリックキー暗号を使用することである。上記された他の攻撃と同様に番組reキーメッセージをサインすることはパイレーツにとって，グループ秘密キー若しくは個人キーの知識なく番組reキーメッセージを偽造することを困難にする。さらにもし，パブリックキー暗号が番組reキーメッセージの伝達で使用されれば，そのときはたとえグループパブリックキーがパイレーツに知られても，グループ個人キーは知られていないのでメッセージは合成されない。

【００９８】他のパイレーツの攻撃の可能性として，パイレーツは合法的な番組メッセージを記録し，かつ該メッセージをターミナルに対し繰り返し再生する。パイレーツは，チップにより保持されたクーポンの数を増加させるため直接チップへ若しくはユーザーインターフェースを通じて制御入力を与えるようターミナルを修正する。この攻撃への対処は，番組記録を作成しかつメモリ内に保存することである。特に，COUPON_CREDITフィールドは与えられているクーポンの数を認証するために使用される。COUPON_PKG_ID及びCOUPON_PROVIDER_IDに加えて，ひとつではなく２つの時間間隔タイマーが必要とされる。一つのタイマーであるCOUPON_PAYOUT_DURATIONはクーポンが与えられる前に加入者が番組を同調しなければならない時間をトラックし，残りの一つである，COUPON_RECORD_DURATIONは，番組記録がメモリから発散される時をトラックする。

【００９９】パブリックキーによる番組reキーメッセージの伝達はより安全なメカニズムである。パイレーツは，番組reキーメッセージを変更するために暗号学的にグループ個人キーを探す必要がある。グループ個人キーは，ネットワーク上のいかなるターミナルへも伝達されない。伝達されるグループパブリックキーの長さは，知覚される著作権侵害の脅威に従い拡張する。また，グループパブリック及び個人キーは新規のEMMsの伝達によって変化され得る。もし，組織的侵害が存在すると，クーポン発行特徴を有する番組reキーECMを失わせることによって，若しくはクーポンによるIPPV購入を許容することによって，インフォマーシャル特徴は簡単に放棄される。

【０１００】上記議論において，クーポンをターミナルへ伝達する３つの異なる方法が存在することがわかった。第１の方法は，グループreキーEMMに基づき，第２の方法はIPPV認証に固く結びつけられ，第３の方法は，“インフォマーシャル”概念を使用する番組reキーECMに基づいている。

【０１０１】グループreキー方法は，IPPVが完全に与え

られたCOUPON_CREDITのみで実行される方法に類似し，COUPON_PROVIDER_IDを有する各サービスプロバイダーに対してターミナル内部にCOUPON_DEBITフィールドが存在することを要求する。

【０１０２】IPPV購入リンク方法は，すでに実行されかつ安全にターミナル内部で認証されたIPPV認証を利用し，さらに適当なパラメータセットを有する番組reキーECMによって伝達されるため，この方法はグループreキー方法と番組reキー方法の間のハイブリッドである。この方法を使用するクーポンは実際のIPPV購入によってのみ伝達される。

【０１０３】番組reキー方法に関して，クーポンの買い戻しは，視聴履歴レポートバックに結びつけられているかいないかである。電話回線のような通信リンクは要求されるためビュワーシップの会計監査に関して，クーポン回収はレポートバックに結びついている。

【０１０４】したがって，本発明はさまざまなプロモーションの目的でデジタルクーポンを加入者に送信するためのシステムを与える。電子的にクーポンを伝達しかつ管理することによって，クーポンは加入者によってより使用されやすくなり，プロモータの分配及び取り扱いコストは非常に減少する。加入者ロイヤリティが与えられるが，加入者はかれらが特別の興味を持ちやすい番組を試験するために選択的にターゲットにされている。加入者はインフォマーシャルのような商業的番組を視聴するよう勧められる。さらに，付加的なレポートバック特徴に関して，プロモーションの効果を決定しかつ付加的な大衆的及び個人データを集めるために，ターミナル使用パターンデータが検索されかつ分析される。さらにまた，手法の完全性はさまざまな暗号技術をもって保証される。

【０１０５】発明はさまざまな特定の実施例について説明されてきたが，特許請求の範囲に記載された発明の思想及び態様から離れることなく，さまざまな付加及び修正が可能であることは当業者の知るところである。

【０１０６】例えば，クーポンクレジットバランスの会計は，ネットワーク制御器若しくはターミナルから離れた他の構成要素によって維持されてもよい。この会計は，自動電話のレポートバック機能が与えれる場合のように，クーポンバランスが変化すると同時にリアルタイム若しくは周期的にアップグレードされる。

【図面の簡単な説明】

【図１】図１は，本発明に従う通信装置のブロック図である。

【図２】図２は，本発明に従う加入者ターミナルのブロック図である。

【図３】図３は，本発明に従って使用するための解読系列を示したブロック図である。

【図４】図４は，本発明に従うユーザーインターフェース用のオンスクリーンディスプレイである。

【図５】図５は，本発明に従うユーザーインターフェース用の他のオンスクリーンディスプレイである。

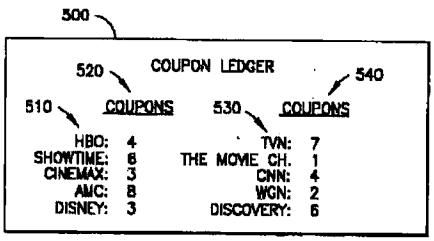
【図６】図６は，本発明に従うユーザーインターフェース用の他のオンスクリーンディスプレイである。

【図７】図７は，本発明に従ってデジタルクーポンを与えるための方法を示すフローチャートである。

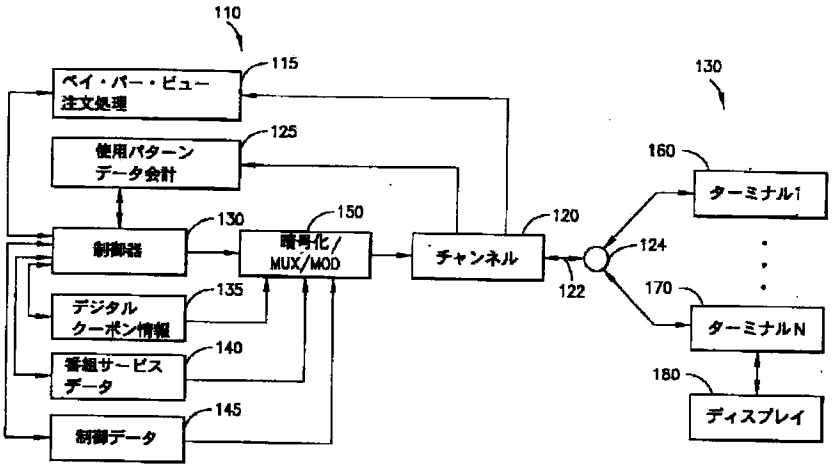
【符号の説明】

110	送信エンド
115	PPV注文処理機能
120	チャネル
122	経路
124	ハブ
125	使用パターンデータ会計機能
130	制御器
135	デジタルクーポン情報機能
140	番組サービスデータ機能
145	制御データ機能
150	暗号器／マルチプレクサ／変調器
160	ターミナル
170	ターミナル
180	ディスプレイ

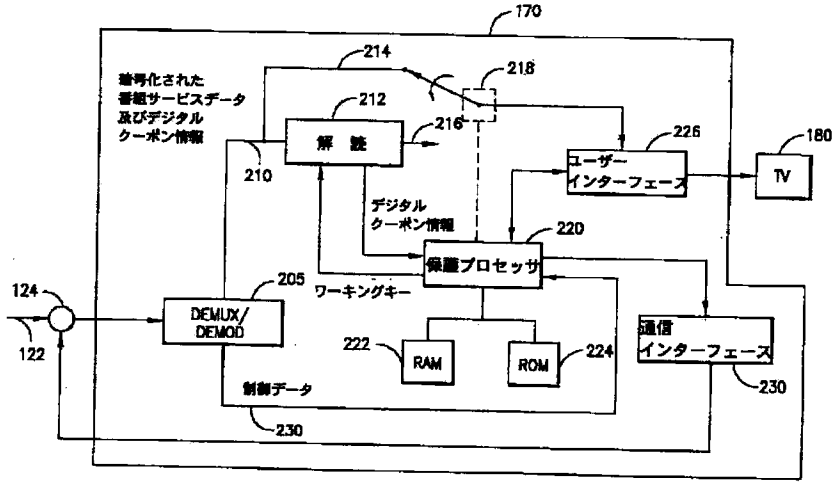
【図５】



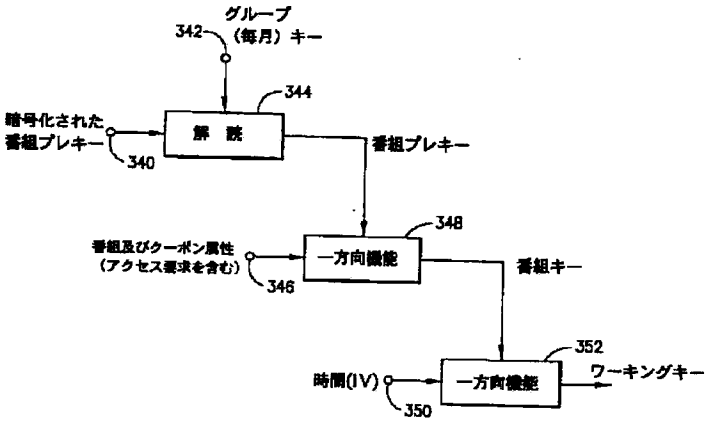
【図１】


110
115
ペイ・パー・ビュー
注文処理
125
使用パターン
データ会計
130
制御器
150
暗号化/
MUX/MOD
120
チャンネル
122
124
130
160
ターミナル1
170
ターミナルN
180
ディスプレイ
135
デジタル
クーポン情報
140
番組サービス
データ
145
制御データ

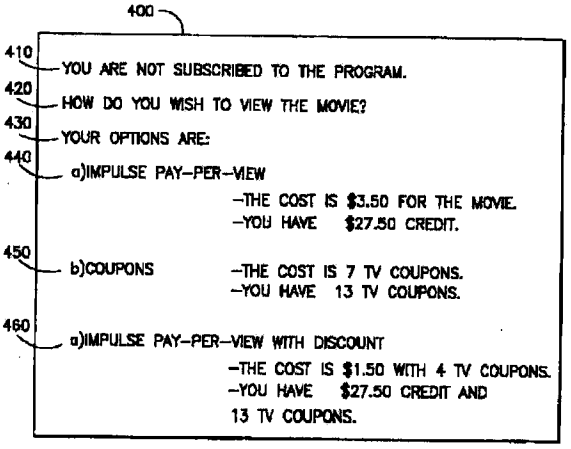
【図２】


170
暗号化された
番組サービスデータ
及びデジタル
クーポン情報
214
218
212
216
解 読
210
226
ユーザー
インターフェース
180
TV
デジタル
クーポン情報
220
保護プロセッサ
205
ワーキングキー
124
DEMUX/
DEMOD
122
222
RAM
ROM
224
通信
インターフェース
230
制御データ
230

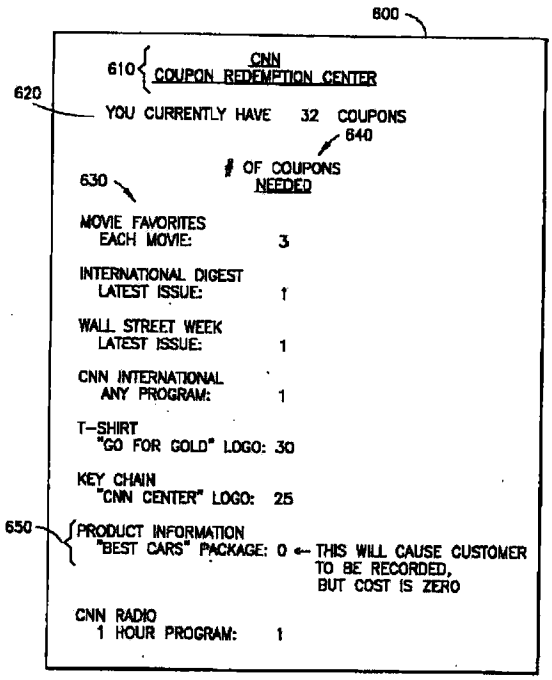
【図3】


グループ
(毎月) キー
342
344
暗号化された
番組プレキー
340
解 読
番組プレキー
348
番組及びクーポン属性
(アクセス要求を含む)
346
一方向機能
番組キー
352
時間(TV)
350
一方向機能
ワーキングキー

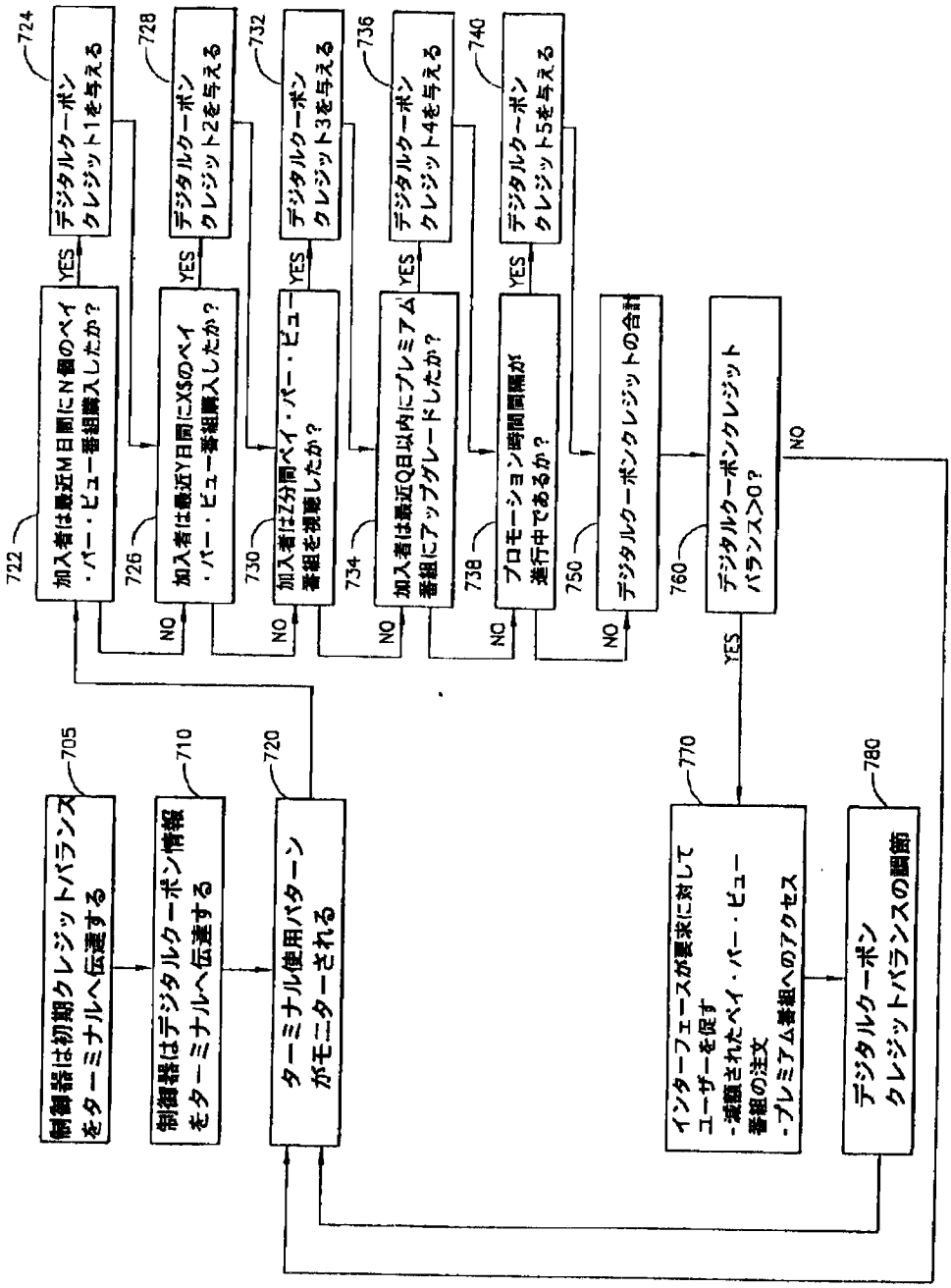
【図4】


400
410
YOU ARE NOT SUBSCRIBED TO THE PROGRAM.
420
HOW DO YOU WISH TO VIEW THE MOVIE?
430
YOUR OPTIONS ARE:
440
a)IMPULSE PAY-PER-VIEW
-THE COST IS $3.50 FOR THE MOVIE.
-YOU HAVE $27.50 CREDIT.
450
b)COUPONS
-THE COST IS 7 TV COUPONS.
-YOU HAVE 13 TV COUPONS.
460
a)IMPULSE PAY-PER-VIEW WITH DISCOUNT
-THE COST IS $1.50 WITH 4 TV COUPONS.
-YOU HAVE $27.50 CREDIT AND
13 TV COUPONS.

【図6】


600
610
CNN
COUPON REDEMPTION CENTER
620
YOU CURRENTLY HAVE 32 COUPONS
640
OF COUPONS
NEEDED
630
MOVIE FAVORITES
EACH MOVIE: 3
INTERNATIONAL DIGEST
LATEST ISSUE: 1
WALL STREET WEEK
LATEST ISSUE: 1
CNN INTERNATIONAL
ANY PROGRAM: 1
T-SHIRT
"GO FOR GOLD" LOGO: 30
KEY CHAIN
"CNN CENTER" LOGO: 25
650
PRODUCT INFORMATION
"BEST CARS" PACKAGE: 0 ← THIS WILL CAUSE CUSTOMER
TO BE RECORDED,
BUT COST IS ZERO
CNN RADIO
1 HOUR PROGRAM: 1

【図7】


制御器は初期クレジットバランスをターミナルへ伝達する
705
制御器はデジタルクーポン情報をターミナルへ伝達する
710
ターミナル使用パターンがモニターされる
720
加入者は最近M日間にN個のペイ・パー・ビュー番組購入したか？
722
YES
デジタルクーポンクレジット1を与える
724
NO
加入者は最近Y日間にX$のペイ・パー・ビュー番組購入したか？
726
YES
デジタルクーポンクレジット2を与える
728
NO
加入者はZ分間ペイ・パー・ビュー番組を視聴したか？
730
YES
デジタルクーポンクレジット3を与える
732
NO
加入者は最近Q日以内にプレミアム番組にアップグレードしたか？
734
YES
デジタルクーポンクレジット4を与える
736
NO
プロモーション時間間隔が進行中であるか？
738
YES
デジタルクーポンクレジット5を与える
740
NO
デジタルクーポンクレジットの合計
750
デジタルクーポンクレジットバランス>0？
760
YES
NO
インターフェースが要求に対してユーザーを促す
-減額されたペイ・パー・ビュー番組の注文
-プレミアム番組へのアクセス
770
デジタルクーポンクレジットバランスの調節
780

フロントページの続き

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【外国語明細書】

1.Title of Invention

DIGITAL COUPONS FOR PAY TELEVISION

2. Claims

1. A communication system, comprising:

a controller for transmitting program services to a plurality of subscriber terminals via a communication channel;

said program services being adapted to be selectively recovered by said subscriber terminals;

said controller being adapted to deliver digital coupon information to said terminals via said communication channel;

said digital coupon information allowing said terminals to obtain credits when recovering first particular ones of said program services according to preconditions of said digital coupon information;

said terminals maintaining a running balance of said credits obtained.

2. The system of claim 1, wherein:

said credits are usable in obtaining second particular ones of said program services at a reduced charge.

3. The system of claim 1 or 2, further comprising:

monitoring means for monitoring a usage pattern of a selected one of said terminals to determine if said preconditions of said digital coupon information have been satisfied;

said usage pattern being indicative of at least one of:

(a) which of at least one of said first particular program services have been recovered by said selected terminal, and

(b) a duration during which at least one of said first particular program services have been recovered by said selected terminal;

wherein said credits are provided when there is a correlation between said usage pattern and said preconditions of said digital coupon information.

4. The system of one of the preceding claims, further comprising:

a user interface for selectively redeeming said credits according to a user input.

5. The system of one of the preceding claims, further comprising:

a user interface for obtaining a confirmation of user involvement when a corresponding one of said

terminals is recovering said first particular ones of said program services.

6. The system of claim 3, wherein:

said first particular ones of said program services provide a plurality of individual programs which are adapted to be individually recovered by said selected terminal; and

said credits are provided when said usage pattern indicates that said selected terminal has recovered at least one of:

(a) a predetermined number of said plurality of individual programs; and

(b) a predetermined amount of charges which are incurred by said selected terminal in recovering at least one of said individual programs.

7. The system of one of the preceding claims, further comprising:

means operatively associated with said controller for encrypting said digital coupon information and said program services according to a common cryptographic key.

8. The system of claim 3, further comprising:

a usage pattern accounting center which is operatively associated with said controller;

said usage pattern accounting center being adapted to receive information indicative of said usage pattern of said selected terminal from said monitoring means via a communication link;

said controller receiving said information indicative of said usage pattern from said usage pattern accounting center for controlling the delivery of said digital coupon information to said selected terminal.

9. The system of one of the preceding claims, wherein:

said controller is adapted to deliver different digital coupon information to different ones of said plurality of subscriber terminals.

10. A subscriber terminal in a communication system, comprising:

means for selectively recovering program services which are received from a controller via a communication channel;

means for receiving digital coupon information from said controller via said communication channel;

said digital coupon information allowing said

terminal to obtain credits when recovering first particular ones of said program services according to preconditions of said digital coupon information; and

means for maintaining a running balance of credits obtained.

11. The terminal of claim 10, wherein:

said credits are usable in obtaining second particular ones of said program services at a reduced charge.

12. The terminal of claim 10 or 11, further comprising:

monitoring means for monitoring a usage pattern of said terminal to determine if said preconditions of said digital coupon information have been satisfied;

said usage pattern being indicative of at least one of:

(a) which of at least one of said first particular program services have been recovered by said terminal, and

(b) a duration during which at least one of said first particular program services have been recovered by said terminal;

said credit being provided when there is a correlation between said usage pattern and said preconditions of said digital coupon information.

13. The terminal of claim 12, wherein:

said first particular ones of said program services provide a plurality of individual programs which are adapted to be individually recovered by said terminal; and

said credits are provided when said usage pattern indicates that said terminal has recovered at least one of:

(a) a predetermined number of said plurality of individual programs; and

(b) a predetermined amount of charges which are incurred by said terminal in recovering of at least one of said individual programs.

14. The terminal of claim 12, further comprising:

a communication interface for communicating information indicative of said usage pattern from said monitoring means to a usage pattern accounting center, which is operatively associated with said controller, via a communication link;

said controller receiving said information indicative of said usage pattern from said accounting center for controlling the delivery of said digital coupon information to said terminal.

15. The terminal of one of claims 10 to 14, further comprising:

means responsive a user interface for enabling said terminal to selectively redeem said credits according to a user input.

16. The terminal of one of claims 10 to 15, further comprising:

means responsive to a user interface for obtaining a confirmation of user involvement when said terminal is recovering said first particular ones of said program services.

17. The terminal of one of claims 10 to 16, wherein:

said digital coupon information and said program services are encrypted according to a common cryptographic key.

18. The terminal of one of claims 10 to 17, further comprising:

authentication means for cryptographically authenticating said digital coupon information.

19. The terminal of claim 18, wherein:

said authentication means authenticates said digital coupon information according to a group key.

20. The terminal of claim 18 or 19, wherein:

said authentication means authenticates said digital coupon information according to a public key.

21. The terminal of one of claims 10 to 20, wherein:

said program services include programs which are encrypted according to associated program re-keys; and

at least a particular one of said program re-keys is communicated to said terminal to allow said terminal to decrypt and recover the associated program using said program re-key; and

said digital coupon information is communicated to said terminal with said program re-keys.

22. A method for transmitting digital coupon information from a controller to a plurality of subscriber terminals in a communication network via a communication channel, said network also being used

for communicating program services from said controller to said plurality of subscriber terminals, said program services being adapted to be selectively recovered by said subscriber terminals, comprising the steps of:

targeting at least selected ones of said terminals to receive said digital coupon information;

delivering said digital coupon information to said terminals via said communication channel;

said digital coupon information allowing said terminals to obtain credits when recovering first particular ones of said program services according to preconditions of said digital coupon information; and

maintaining a running balance of said credits obtained at said terminals.

23. The method of claim 22, wherein:

said credits are usable in obtaining second particular ones of said program services at a reduced charge.

24. The method of claim 22 or 23, comprising the further step of:

monitoring a usage pattern of a selected one of said terminals to determine if said preconditions of said digital coupon information have been satisfied;

said usage pattern being indicative of at least one of:

(a) which of at least one of said first particular program services have been recovered by said selected terminal, and

(b) a duration during which at least one of said first particular program services have been recovered by said selected terminal; and

providing said credits when there is a correlation between said usage pattern and said preconditions of said digital coupon information.

25. The method of claim 24, wherein said first particular ones of said program services provide a plurality of individual programs which are adapted to be individually recovered by said selected terminal, said method comprising the further step of:

providing said credits when said usage pattern indicates that said selected terminal has recovered at least one of:

(a) a predetermined number of said plurality of individual programs; and

(b) a predetermined amount of charges which are incurred by said selected terminal in recovering at least one of said individual programs.

26. The method of claim 24 or 25, comprising the further steps of:

receiving information indicative of said usage pattern of said selected terminal from said monitoring means via a communication link; and

controlling the delivery of said digital coupon information to said selected terminal according to said information indicative of said usage pattern.

27. The method of one of claims 22 to 26, comprising the further steps of:

providing a user input to said terminals; and

selectively redeeming said credits according to said user input.

28. The method of one of claims 22 to 27, comprising the further step of:

obtaining a confirmation of user involvement when a corresponding one of said terminals is recovering said first particular ones of said program services.

29. The method of one of claims 22 to 28, comprising the further step of:

encrypting said digital coupon information and said program services according to a common cryptographic key.

30. The method of one of claims 22 to 29, comprising the further step of:

delivering different digital coupon information to different ones of said plurality of subscriber terminals.

3. Detailed Description of Invention

BACKGROUND OF THE INVENTION

The present invention relates to communications networks such as cable television, satellite television and computer networks over which services are available for a fee. In particular, an apparatus and method are presented for allowing users of services such as pay television to obtain credits when viewing particular programs. The invention enables service providers to transmit credit information in the form of "digital coupons" to individual subscriber terminals to promote particular programs and reward viewer loyalty.

Cable and satellite television networks where video services are available for a fee are well known. Also well known are computer network services such as CompuServe, Prodigy, America Online, Knight-Ridder Information Service, and others where databases, banking and shopping services can be accessed and e-mail and the like can be communicated, all for a fee. In the past, some networks have provided services on a free trial basis. For example, during promotional periods lasting for one or two days, for example, premium programming services such as movie or sports channels could be viewed by subscribers who normally would have to pay an additional charge to receive such programming. In most cases, this is done by placing the entire service into some sort of promotional scrambling mode where the programs are

either not scrambled, i.e. in-the-clear, or use fixed keys which are known to all subscriber terminals. For example, in a broadcast environment, service providers do not know which existing customer or potential new customer is attempting to access a particular service. Even if feedback could be obtained, for example, using a telephone line or some upstream path, there would be too many transactions of customers tuning in and out of services for the service provider to usefully analyze.

Consequently, the service must usually be placed in a scrambling mode which allows free accessed by everyone, including potential new customers and even existing customers, or at least a large defined group. Moreover, an extended period of free service time is usually needed to effectively promote services since the different programs which are made available during the free preview will appeal to different interest, demographic, and age groups of viewers. For example, some viewers may prefer to see action movies while others prefer to see comedies. Thus, it is necessary to provide a wide variety of free programming over an extended period of time to effectively encourage viewers to subscribe to the premium programming services for an additional monthly charge.

During the free preview period, renewal and new subscriptions rates may be reduced to further motivate the customer since the customer may

otherwise wait until after the free preview period is over to order new services which may, in turn, stress the call handling capability of the service provider's subscription center.

Additionally, various programs may be offered on an individual or a-la-carte pay-per-view (PPV) basis, where the subscriber pays a fee to view a single program. The customer may either call ahead to the subscription center to have a specific authorization or entitlement for a single program sent to the customer's terminal, or the customer can arrange to have a certain amount of monetary credit downloaded into the customer's terminal. With the selection of PPV program, the a pre-stored credit amount in the terminal is reduced. Such PPV may be offered at fixed times or staggered times with so-called Near Video On Demand (NVOD). Also programs may be delivered essentially instantaneously with Video On Demand (VOD).

In VOD system systems, the program can be delivered on demand to a specific subscriber when that subscriber communicates a buy signal to a video server located at a cable television system headend. The buy signal may be communicated, for example, through an available upstream channel in a cable television network, or via a telephone line.

Various marketing techniques have been used to encourage subscribers to purchase pay-per-view programs. PPV usually are more profitable for the service provider than subscription services. These marketing techniques include providing the

subscriber with a credit on his monthly statement when the subscriber purchases a predetermined number of PPV programs, or spends a predetermined amount of money on PPV programs. Or, the subscriber may be mailed a paper coupon which the subscriber can later mail back to the network billing department to obtain a discount after the subscriber has met the preconditions for redeeming the coupon. For example, the paper coupon may entitle the subscriber to a credit of one-half the price of a PPV program when one PPV program is purchased at the regular price.

While such marketing techniques can be effective, some subscribers may become accustomed to receiving paper coupons and other discounts on their monthly statements and may then resist paying higher fees when such discounts are not offered. In other words, they will only buy if they get a coupon. It would be desirable to reward the subscribers after they have met some predetermined conditions. Additionally, it is not easy to selectively target groups of subscribers or individual subscribers, without making the entire service free; or to monitor the effectiveness of such promotions. Moreover, the effectiveness of conventional promotions may be reduced because the realization of the discount by the subscriber is delayed, typically for a number of weeks due to delays in the billing cycle. Furthermore, paper coupons are difficult to organize and handle and are easily lost.

Accordingly, it would be desirable to provide a method and apparatus for allowing selective targeting of promotions of programming services to particular subscribers or groups of subscribers without placing services in free mode, or using paper coupons. The system should allow subscribers to receive an immediate credit when a predetermined viewing pattern has been met. The system should reward subscriber loyalty and encourage subscribers to purchase additional programming services such as PPV programs and/or additional levels of service, such as premium programming services.

The system should also organize the credits in a way to allow the subscriber to take a quick inventory, and should inform the subscriber when a service is available through the promotion. The system should allow flexibility as to how the credits may be used, for example, in regard to the variety of shows, times, and dates the programming may be accessed.

Furthermore, it would be desirable to provide a system for monitoring the success of such promotions, gain feedback on subscriber viewing habits, and determine the viewership (e.g., audience size) of particular programs. The system should employ cryptographic techniques to thwart unauthorized persons (e.g., pirates) who attempt to tamper with the system for illicit gain.

The present invention provides a system having the above and other advantages.

SUMMARY OF THE INVENTION

In accordance with the present invention, an apparatus and method are presented for allowing users of services such as pay television to obtain credits when viewing particular programs. The invention enables program service providers to transmit credit information in the form of "digital coupons" to individual subscriber terminals to promote particular programs and reward viewer loyalty.

A communication system in accordance with the present invention includes a controller for transmitting program services to a plurality of subscriber terminals via a communication channel. The program service may include television programs which are broadcast or continuously transmitted on a predetermined schedule, pay-per-view programs which require specific user selection and either a local transacted or remotely transacted purchase, Near Video-On-Demand which is pay-per-view offered at staggered broadcast times, and Video-On-Demand services, which are transmitted only in response to a user request, or other electronic information such as computer software.

The communication channel may include a cable plant and/or satellite link, for example. The program services can be selectively recovered by the subscriber terminals. For example, a subscriber may select a particular program to view by tuning in the

corresponding channel using an on-screen interface, e.g. Electronic Program Guide (EPG), and a remote control unit, or by transmitting a buy order for either PPV or Video-On-Demand programming.

The controller can deliver digital coupon information to the terminals along with program service data using any available technique, such as frequency or time multiplexing. The digital coupon information allows the terminals to obtain credits when recovering particular programs as defined by preconditions of the digital coupon information. For example, the subscriber may receive a credit for one free PPV program when the precondition of purchasing five PPV programs at regular prices has been met. The terminal automatically tracks the balance of coupon credits as coupons are awarded and redeemed. The credits are usable in obtaining program services at a reduced charge (e.g., at a discount or free).

Each terminal includes a processor which monitors a usage pattern (e.g., viewing history) of the terminal to determine if the preconditions of the digital coupon information have been satisfied. For example, the usage pattern may indicate which programs have been recovered by the terminal within the last month, or some other period, or the length of time that a particular program, or program service (e.g., channel) was viewed. The terminal may simply grant coupons based on the purchase of a PPV program, or based on the amount of time spent viewing an infomercial. The credits are thus awarded when there

is a correlation between the usage pattern and the preconditions of the digital coupon information.

A user interface such as a graphical user interface (e.g., on-screen display) may be provided to allow the subscriber to selectively redeem the credits. For example, the user may have a variety of options from which to choose, where a cash balance and/or a coupon balance are redeemed in full or in part. The user interface can also be used to obtain a confirmation of user involvement. For example, to verify that the subscriber is still viewing a program, he may be periodically required to provide some sort of control input as the program is displayed.

When the program services include individual programs which can be individually recovered by the terminals, such as with a PPV scheme, the coupon credits are awarded when the usage pattern indicates that a terminal has recovered a particular number of such individual programs, or a particular amount of charges. This allows a coupon credit to be awarded whenever a PPV program has been accessed. One or more coupons may need to be redeemed in order to access a program.

To allow program service providers and advertisers to obtain and analyze the terminal usage data, a usage pattern accounting center which is associated with a network controller may be provided. The usage pattern accounting center can receive usage pattern data from the terminals via a communication link, such as an upstream path in the channel over which the program services are transmitted, or a

telephone network. This is especially useful for determining the viewership of commercials or infomercials wherein the cost of running the ad in a program is oftentimes a function of the estimated viewing audience.

Moreover, the network controller can control the delivery of the digital coupon information to the terminals based on the received usage pattern data. In this case, the network controller can deliver the digital coupons directly to the terminal in a similar fashion as with other entitlements such as subscription entitlements, PPV entitlements, and credit information. For example, subscribers who demonstrate a preference for sports programs can receive digital coupon information which provides discounts for future special sports events.

The controller can thus deliver different digital coupon information to the different subscriber terminals based on the usage pattern data or other demographic or individual data which has been compiled by other means. The digital coupon information can provide different preconditions for obtaining the same credits, or the same preconditions for obtaining different credits. For example, it is possible to reward favored subscribers such as those who purchase relatively more programming by providing the favored subscribers with more coupons than other, less favored, subscribers when the same viewing preconditions are met.

Various cryptographic techniques may also be employed to prevent unauthorized access to the digital coupons.

A corresponding subscriber terminal and method are also presented.

DETAILED DESCRIPTION OF THE INVENTION

A method and apparatus are presented for allowing users of program services such as pay television to obtain credits when viewing particular programs. The invention enables program service providers to transmit credit information in the form of "digital coupons" to individual subscriber terminals to promote particular programs and reward viewer loyalty. The digital coupons may be generated locally in the terminals based on criteria sent by the service providers, or transmitted directly as an entitlement by the service provider.

FIGURE 1 is a block diagram of a communication system in accordance with the present invention. The system includes a transmitting end, shown generally at 110, a channel 120, and a receiving end, shown generally at 130. The transmitting end 110 includes a central controller 130 which communicates with a PPV order processing function 115, a terminal usage pattern data accounting function 125, an encryptor/multiplexer/modulator 150, a digital coupon information function 135, a program service data function 140, and a control data function 145.

The receiving end 130 includes a number of terminals including terminal 1 (160) through terminal N (170), which receive the digital coupon information, program service data, and control data via a hub 124 and path 122. Each terminal has an

associated display such as a television for displaying the program service data. For example, "terminal N" 170 has an associated display 180. In the example shown, the terminals 160, . . ., 170 are able to communicate with the PPV order processing function 115 and usage pattern data accounting function 125 via the channel 120.

For example, in a cable television network, such upstream communication may be provided on a channel (e.g., RF spectrum) which is separate from the channels over which the program service data is communicated. A frequency-division multiplexing scheme may be used to achieve this goal. Alternately, a time-division multiplexing scheme may be used, or the terminals 160, . . ., 170 may communicate with the PPV order processing function 115 and usage pattern data accounting function 125 via a separate communication link such as a telephone network. Moreover, as discussed in greater detail below, the present invention can be implemented without the PPV order processing function 115 and/or usage pattern data accounting function 125

The channel 120 may comprise coaxial cable, optical fiber, and/or a wireless link such as a satellite or RF broadcast link. The transmitting end 110 of the system may be a cable television system headend, a satellite uplink center, or an RF broadcast center, for example.

The digital coupon information function 135 comprises a memory for storing digital coupon

information in accordance with the present invention. The digital coupon information is communicated to the terminals 160, . . ., 170 at the receiving end 130 of the system. Furthermore, when the terminals 160, . . ., 170 are addressable, the digital coupon information may be targeted to individual terminals and/or to groups of terminals, for example, according to demographic data. Alternatively, the digital coupon information may be transmitted via a path which is separate from that of the program services.

The digital coupon information provides credits which the terminals can use for a number of purposes. For example, the digital coupon information may provide a discount when the terminals order one or more PPV programs through the PPV order processing function 115. As an example, if a terminal orders five PPV programs within the current billing cycle, the digital coupon credit may allow the terminal to order a sixth PPV program at no charge. Or, for terminals that order PPV programs infrequently, the digital coupon credit may allow the terminal to order a first PPV program at half-price. The digital coupon may be generated automatically based on program coupon criteria established by the service provider. This has the advantage of requiring no direct involvement by the service provider. This is also suitable for broadcast environments where the return path either does not exist, is slow, or not set-up for interactive transactions.

Alternatively, the digital coupon information may allow the terminals to access premium program services at a reduced charge, or at no charge, or allow the terminals to access other information, such as a software program, a computer game, a book in electronic form, a musical composition, an on-screen television program guide, movie or restaurant reviews, or other promotional, informational or educational material. For example, the digital coupon information may allow a terminal to access a premium movie channel for two days with each PPV purchase, or to download one computer video game, or to gain one hour of free connect time to a computer database.

The term "program service" is thus used herein to encompass television, multimedia, and other audio and/or video signals as well as computer software or virtually any other information that can be accessed by, and/or communicated to, the terminals via the channel 120. The term "credit" is used herein to indicate that the terminals are provided with a benefit such as a reduced or waived charge when accessing and/or obtaining program services via the channel, or for obtaining merchandise via the channel which is delivered to the subscriber by other means (e.g., by mail).

The terminals 160, . . ., 170 do not realize the credit which is offered with the digital coupon information until the terminals satisfy certain preconditions. Each terminal includes means for monitoring various factors which define the

terminal's usage pattern data over a defined time period, including, for example, the number of PPV programs purchased, the amount of PPV charges incurred, whether, and for what duration, the terminal has been tuned to a particular program or program service, whether the terminal has recently upgraded to one or more premium program services, and whether a promotional period is in effect. The promotional period may apply to individual terminals, such as those of new subscribers, to selected groups of terminals, or to all terminals.

Accordingly, monitoring means in the terminals monitor the above factors to determine whether the usage pattern of the terminal corresponds with the preconditions of the digital coupon information. Optionally, in a "report-back" function, the usage pattern data is periodically transmitted from the terminals to the usage pattern data accounting function 125, for example, via the hub 124 and channel 120, or, alternatively, via a telephone network. For example, the usage data may be transmitted daily, weekly, or monthly.

Such usage pattern data provides valuable information for program service providers and advertisers which can be used to better target individual subscribers and groups of subscribers with products and services with which they are likely to be interested. Moreover, the usage pattern data allows the interested parties (e.g., promoters and advertisers) to determine the effectiveness of various promotions. For example,

when the digital coupon information provides a one-half price PPV program to subscribers who infrequently order PPV, the success rate of the program can be determined from the usage pattern data at the function 125.

As another example, when the digital coupon information provides two free days of access to one of a number of available premium program services, the selected premium program service can be monitored, and the subscriber can be subsequently offered a digital coupon which allows him to upgrade to the selected premium program service, e.g., at one-half off the normal charge for the first month. Various other marketing strategies may be used with the present invention to enhance revenue and customer goodwill. For example, a subscriber may be given coupon credit for a free pay-per view movie on his birthday.

Moreover, the digital coupon balance may be adjusted according to lotteries or other contests or games. For example, subscribers may be able to enter a lottery for additional coupons if they spend a certain amount of money. Or, the subscriber may play interactive games of chance where the prizes and losses are determined in terms of coupons.

However, even if the usage pattern data is not reported back to the function 125, the monitoring means in the terminal can determine whether the usage pattern data meets the preconditions of the digital coupon information. Preferably, this is

done in a secure manner to prevent tampering by pirates, as discussed in further detail below.

The controller 130 causes the digital coupon information from function 135 to be encrypted and multiplexed at the encryptor/mux/modulator 150 along with the program service data from function 140 and the control data from function 145. The program service data may comprise video and/or audio data which is stored locally on storage media, and/or which is received from an external source such as a satellite downlink. Alternatively, the program service data may comprise computer software or other electronic information.

The control data includes cryptographic data which is used for generating working keys at the terminals for decoding the received data. Typically, one or more premium program services are communicated with basic program services over the channel 120. Both the basic and premium program services may be accessed with possession of the appropriate group key or keys. The group key or keys are delivered as part of an Entitlement Management Message (EMM). Possession of the group key or keys along with the appropriate entitlement control data allows the terminals to recover program keys from the program data sent by the service provider in Entitlement Control Messages (ECM).

The program keys allow the derivation or decryption of the working keys which are used to encrypt the programming signal at the uplink or headend side, and to decrypt the program signals on

the downlink or consumer decoder side. The term "recover" is used herein to indicate that a program service is received at a terminal and retrieved for use (e.g., display) by the subscriber.

The control data included in an Entitlement Control Message (ECM) is used to control access to a particular program service (i.e., channel). The ECM control data tells the terminal which entitlement needs to be held by the terminal in order to be authorized to access and recover the particular program service. Typically, the ECM message which delivers the control data information is also used to deliver the program key information. The ECM message therefore not only defines program parameters but also delivers a key or precursor key (e.g., pre-key).

The ECM control data may further include data for providing the terminals with the cost for ordering a PPV program. This control data may further indicate the cost, in terms of the number, and type of coupons required to access the program, along with other details listing what number of coupons is required for a discount, and so forth.

FIGURE 2 is a block diagram of a subscriber terminal in accordance with the present invention. Like-numbered elements correspond to the elements of FIGURE 1. A demultiplexer/demodulator 205 of the terminal 170 receives the program service data, digital coupon information, and control data from the path 122 and hub 124. Demultiplexing and demodulating is performed using conventional

techniques. The encrypted program service data is provided to a decryption processor 212 and a switch 218 via lines 210 and 214, respectively, while the encrypted control data and digital coupon information are provided to a secure processor 220 via line 230.

The encrypted program service is decrypted by the decryption processor 212 to provide a clear signal at output 216 of the decryption processor. The secure processor 220 may receive the decrypted digital coupon information from the decryption processor 212. The decryption processor 212 can utilize a conventional decryption scheme, such as that disclosed in Gilhousen, et al., U.S. patent 4,613,901 entitled "Signal Encryption and Distribution System for Controlling Scrambling and Selective Remote Descrambling of Television Signals," or Bennett et al., U.S. patent 4,864,615 entitled "Reproduction of Secure Keys By Using Distributed Key Generation Data," both incorporated herein by reference.

The decryption processor requires working keys (WK) to decrypt the signals input thereto via line 210. The working keys are generated by the secure processor 220 in response to the control signals received via line 230. Firmware for the secure processor is stored in read only memory (ROM) 224. The secure processor 220 is also provided with random access memory (RAM) 222. A secure portion of the RAM 222 holds unit specific keys and/or seeds for use in decryption of a monthly group key, as

discussed in greater detail in connection with FIGURE 3.

A user interface 226 enables a viewer to select program services for viewing on a television (TV) 180. If a user is authorized to receive the selected service by subscription, individual purchase (e.g., pay per view), or according to a digital coupon credit, the secure processor 220 will actuate the switch 218 to couple the decrypted output 216 from decryption processor 212 to the TV 180 via user interface 226. Otherwise, the user interface and TV will only receive the encrypted signal via line 214 and switch 218. As will be appreciated by those skilled in the art, switch 218 could alternatively be configured to provide a barker channel (e.g., a fixed message) to the user, or no signal at all, in the event that the user is not authorized to access the selected service.

The secure processor 220 monitors the programming which is selected by the user via the user interface 226 to determine whether the user has met the preconditions for obtaining the digital coupon credit. For example, if the digital coupon provides a credit for one free PPV program when five PPV programs are purchased at the regular price, the secure processor will record each occurrence of a purchase of a PPV program. The RAM 222 may be used to store the corresponding data. The usage pattern data thus includes data which is related to the digital coupon preconditions but can include other user selections as well. A communication interface

230 such as a data modem is provided to allow the terminal to transmit buy orders for VOD programming and certain types of programming which require a service provider's authorization for acquisition to the PPV order processing function 115 of FIGURE 1. PPV purchases processed locally by the terminal and stored internally to the terminal may be forwarded to the PPV processing function for billing purposes. The interface 230 also allows the terminal 170 to transmit the usage pattern data to the usage pattern data accounting function 125 of FIGURE 1.

The terminal receives control data in the form of an Entitlement Management Message (EMM) which provides an initial currency credit balance for the terminal 170. In this case, when a user orders PPV programs, for example, the overall currency credit balance is decreased by the cost of the programs. The EMM message originating from the service provider may or may not deliver an initial or additional coupon credit to the terminal.

Typically, coupon credit is generated when the preconditions for obtaining the digital coupon credit are realized. The coupon credit balance can be immediately adjusted. As an illustration, assume the initial credit balance is $40, and each PPV program costs $5. Then, the credit balance will drop successively to $35, $30, $25, $20 and $15 after the first five programs are purchased. At this time, the usage pattern data meets the preconditions of the digital coupon information, and the coupon credit balance gets incremented by one.

Alternatively, the coupon credit balance is incremented by one with each PPV purchase. When the terminal tunes in to the sixth program, the terminal receives a Entitlement Control Message (ECM) for the program. The terminal uses the ECM to determine the different ways that the program may be accessed. The ECM will also describe the currency cost and the coupon cost, if the program is available by coupon. The terminal will automatically determine whether or not the terminal has a coupon or coupons to acquire the program. If so, the program is automatically offered to the viewer, or the viewer is prompted to purchase the program using currency or coupons.

By choosing the coupon option, the next order for a PPV program is provided free, and the coupon credit field is decremented appropriately. Thus, the balance remains at $15. Alternatively, the terminal is charged for the sixth program, but the secure processor increments the credit balance by the cost, so there is no net change in the credit balance. The secure processor may provide a display on the user interface 226 that informs the viewer that the preconditions of the digital coupon information have been met. Of course, it is possible for coupon credits to accumulate when the corresponding preconditions are met but the credits are not realized, i.e., cashed in. The credits may be retained in the terminal for a predetermined period such as two or three months, or indefinitely. The secure processor may inform the subscriber if the credits are about to expire.

As described in further detail below in connection with FIGURES 4-6, the viewer may query the user interface 226 to determine the credit balance along with other related information.

FIGURE 3 is a block diagram illustrating a decryption hierarchy for use in accordance with the present invention. An encrypted program pre-key is input via terminal 340 to a decryption function 344 which also receives a monthly group key via terminal 342. The program pre-key is unique to each encrypted program offering (e.g., television program) that is available for decryption. The group key is changed on a periodic basis, e.g., once each month. The decryption function 344 decrypts the encrypted program pre-key to provide a program pre-key that is used as one input to a one-way function 348. The other input to one way function 348 comprises various program and coupon attributes, including access requirements, such as coupon and currency cost, for the corresponding program. The access requirements must be met to obtain authorization to view the program. The program and coupon attributes are input via terminal 346, and the one way function processes the program pre-key and program attributes to provide a program key.

The program key output from one way function 348 is used as one input to another one way function 352 that also receives, via terminal 350, an initialization vector (IV) representative of time. The processing of the initialization vector and

program key by one way function 352 generates the working keys required by decryption processor 212 of FIGURE 2 to decrypt the program service selected by an authorized user. A further description of the generation of the various keys, including working keys (provided in a "keystream"), can be found in the aforementioned Bennett, et al. patent.

Optionally, the digital coupon information and program services can be encrypted according to a common cryptographic key. This could allow an authenticated file, for example, which represents a coupon image, to be sent to the decoders. The coupon could subsequently be redeemed as an authenticated image by transmitting the coupon from the decoder to the program service provider or other accounting center.

FIGURE 4 is an on-screen display for a user interface in accordance with the present invention. The display 400 may be invoked as part of a graphical user interface (GUI) which allows a user to select channels and control other features such as volume and the like. Such interfaces are well known in the art. The display 400 may be controlled by a hand-held remote control, a pointing device, voice command or any other available means. For example, a user may select a PPV program such as a movie from a graphical user interface which causes the display 400 to appear.

The display 400 includes a field 410 which informs the user that he is not currently subscribed to the selected program. That is, the user must

order the program. A field 420 informs the user that he has different options in ordering the program. Fields 430-460 present the options. A field 440 presents a first option wherein the movie may be purchased as an impulse pay-per-view (IPPV) program with the cost being deducted from an available cash credit balance. The user is thus informed of the cash cost of the movie and the available cash credit balance. The program can be purchased as long as there is a sufficient cash credit balance.

A field 450 presents a second option, where the program may be purchased using digital coupons alone. The user is informed of the coupon cost of the movie and the available coupon credit balance. The program can be purchased as long as there is a sufficient coupon credit balance. The digital coupons are referred to here as "TV" coupons.

A field 460 presents a third option, where the program may be purchased using a combination of cash and digital coupons. The user is informed of the cost of the movie using both coupons and cash, and the available cash credit balance and coupon credit balance. While only one cash/coupon combination is provided in field 460, it will be understood that other combinations may also be provided. In fact, the coupons may be assigned a cash value for this purpose.

In another option, not shown, a subscriber may order a PPV program for a discount if the subscriber is willing to have commercial messages appear which

would not otherwise be present. For example, a commercial message using teletext may appear on the bottom portion of the screen when viewing a PPV movie. Or, with VOD, the PPV movie chosen may have periodic commercial message breaks when the discounted program is selected, whereas no commercials would be provided otherwise.

FIGURE 5 is another on-screen display for a user interface in accordance with the present invention. Here, the display 500 provides information on the number of coupon credits which have been accumulated while viewing different channels. For example, the various program service providers may provide viewers with coupons based on the number of hours of that service provider which is viewed per week, and/or which programs were viewed.

Fields 510 and 530 list the various program service providers, while fields 520 and 540 list the number of coupon credits which have been accumulated. For example, for the service provider Home Box Office (HBO), there is a balance of four coupons. In this manner, the program service providers may compete to encourage viewership. For example, when launching a new program, additional coupons may be provided. Furthermore, coupons may be accumulated based on the time of day or day of week that programs are viewed. Moreover, program service providers that are commonly owned may award coupons to encourage viewership of their programs.

FIGURE 6 is yet another on-screen display for a user interface in accordance with the present invention. The display 600 provides an example of the variety of items from which the subscriber may select using the digital coupons of the present invention. Moreover, each of the program service providers along with other interested parties may offer their own items. A field 610 indicates that the particular display 600 is that of the service provider Cable News Network (CNN). A field 620 indicates the current coupon credit balance, while a field 630 indicates the items that may be obtained, and field 640 indicates the number of coupons needed to obtain each item.

Thus, the user may redeem the digital coupons for a wide variety of items, including additional programming that can be communicated to, or accessed by, the terminal as well as non-programming items which can be delivered to the user's home, e.g., by mail.

Some items may not require any digital coupons. For example, a field 650 describes product information which can be communicated to the subscriber's terminal or delivered to the subscriber's home at no cost. However, when the subscriber requests the product information, the usage pattern data is updated and may be subsequently provided to the usage pattern data accounting function 125 of FIGURE 1, where it may be used for marketing purposes.

FIGURE 7 is a flowchart illustrating a method for providing digital coupons in accordance with the present invention. The flowchart describes an embodiment where an initial cash credit balance is provided to a terminal, for example, on a monthly basis. Then, when the user desires to view programming such as PPV programming that has an associated cost, the cost is deducted from the cash credit balance. Furthermore, when the user meets the preconditions of the digital coupon information as determined by the usage pattern data, a coupon credit balance is accumulated. The coupon credit balance may be used to purchase additional program services in lieu of cash, or, optionally, to defray the cost of programs already purchased. In the latter case, the coupon credits may be assigned a cash value.

At block 705, the controller at the transmitter delivers an initial cash credit balance to the terminals. The amount delivered to each terminal may be different and may be based, for example, on past purchasing habits. At block 710, the controller delivers the digital coupon information to the terminals. Again, different terminals may receive different coupon data according to demographic factors and the like. At block 720, the terminal usage pattern is monitored and recorded. In particular, events which meet the preconditions of the digital coupons are recorded, while other data indicative of user habits may also be recorded.

The digital coupon preconditions may account for a variety of events, such as whether the subscriber has purchased a given number N of PPV programs in the last M days (block 722), in which case a digital coupon credit "1" is awarded at block 724. It will be appreciated that different types and amounts of coupons may be awarded according to the particular precondition which the viewer meets. For example, some coupon credits may be more valuable than others, or may be redeemed for different benefits.

At block 726, if it is determined that the subscriber has purchased X$ of PPV programs in the last Y days, a digital coupon credit "2" is awarded at block 728. At block 730, if the subscriber has viewed an "infomercial" for a number Z minutes, a digital coupon "3" is awarded at block 732. An "infomercial" is a commercial message that has the length and format of a regular program, e.g., such as one-half hour or more, and generally garners a relatively small audience. For marketing purposes, it is desirable to reward viewers for viewing infomercials even though there is no charge incurred for viewing the program. Optionally, coupon credit may be awarded only for the first viewing of the program, so additional coupon credits are not awarded for repetitive viewing of the same program.

At block 734, if the subscriber has upgraded from a basic programming tier to a premium programming tier, or to a higher premium programming tier, a digital coupon "4" is awarded at block 736.

At block 738, if a promotional period is in progress, a digital coupon "5" is awarded at block 740. Such a promotional period would generally apply to all subscribers.

At block 750, the total amount of coupon credits is determined. At block 760, if the coupon credit balance is above zero, then at block 770, the user is prompted by the user interface (e.g., every time the television is turned on) to select among the various options which are available in redeeming the digital coupons. For example, the subscriber may order PPV programming for a discount or no charge, access premium programming for a predetermined period of time, or simply pass and take advantage of the available options at another time. The various options have been discussed above in greater detail in connection with FIGURES 4-6. In addition to the periodic prompts described above, a user will also have the capability of accessing the coupon redemption menu at any time via the remote control.

At block 780, the digital coupon balance is adjusted by the number of coupons redeemed at block 770, and the monitoring of the terminal usage pattern continues at block 720.

Note that it is possible to verify that the user is actually viewing a particular program by requiring some sort of subscriber involvement. For example, to verify that a subscriber has watched an infomercial for Z minutes, the terminal may require the subscriber to input a command to the user

interface. The user interface may provide a message such as "Do you wish to continue", to which the subscriber must respond to meet the digital coupon preconditions. An internal timer within the terminal may be halted until a response is received.

For subscribers who view infomercials and the like, to ensure that only one set of coupons are awarded per program, the COUPON_RECORD_DURATION field as discussed below in Table 3 is provided to indicate a duration in which the program record of the infomercial is stored in the terminal. This precludes the same subscriber from getting repeated coupons for the same infomercial that is run again and again, while still enabling the same program ID for the infomercial to be used repeatedly.

The data delivery syntax set forth below in Tables 1-4 may be used in accordance with the present invention. Tables 1-3, respectively, describe data fields which may be used when digital coupons are delivered to terminals using an EMM, an IPPV ECM purchase linkage, and a program re-key ECM. Table 4 describes data fields which may be used with all delivery methods. It should be appreciated that the syntax shown is for illustration only and that other data delivery schemes may be substituted.

TABLE 1

Syntax	Size	Description
COUPON_PROVIDER_ID	3 bytes	Identifies coupon sponsor
NEW_COUPON_CREDIT	3 bytes	Absolute number of coupons for service provider in a month
NEW_COUPON_DEBIT	3 bytes	Absolute debit for service provider in a month
COUPON_CREDIT	3 bytes	Total accrued coupons
COUPON_SEQ_NUMBER	1 byte	Epoch (time period) of coupon delivery

TABLE 2

Syntax	Size	Description
COUPON_PROVIDER_ID	3 bytes	Identifies coupon sponsor
COUPON_CREDIT	1 byte	Coupon credit remaining

TABLE 3

Syntax	Size	Description
COUPON_ID	2 bytes	COUPON_ID + COUPON_PROVIDER_ID = unique coupon ID)
COUPON_PAYOUT_DURATION	2 bytes	Time period subscriber must view program to obtain coupon credit.
COUPON_RECORD_DURATION	3 bytes	Time period coupon is retained at terminal
COUPON_PROVIDER_ID	3 bytes	Identifies coupon sponsor

TABLE 4

Syntax	Size	Description
COUPON_DEBIT	2 bytes	Number of accrued coupon debits
COUPON_PACKAGE_ID	2 bytes	Type of coupon for package program
IPPV_CREDIT	2 bytes	Cash credit balance for pay-per-view
PACKAGE_PROVIDER_ID	2 bytes	Identifies service provider of package of programs
PKG_COST	1 byte	Cash charge for package program
PKG_ID	1 byte	Identifies package
PROGRAM_PAYOUT_DURATION	1 byte	Minimum time subscriber must view program to gain credit
PROGRAM_INFORMATION	2 bytes	Video/audio data of program
SHOW_COUNT	2 bytes	Count of shows purchased
VH_LIMIT	2 bytes	View History Limit before report back is mandatory
VIDEO_PROVIDER_ID	2 bytes	Identifies service provider

To thwart piracy, digital coupons may only be offered to subscribers with established impulse PPV accounts where there is a report-back capability. This can be effected, for example, by using a bit as

a flag in either the group re-key EMM or Program re-key ECM.

The report-back feature discussed above in connection with the usage pattern data accounting function 125 of FIGURE 1 allows the program service providers and network controller to monitor the audience size for different programs. The use of digital coupons can therefore allow the service providers to detect viewership patterns over a wide cross-section of programs, and not just premium shows. In other words, shows which are not available through PPV might be made available through coupons.

In the following program delivery scenarios, it is assumed that a real channel (i.e., program) must exist which can be purchased with coupons. This can be enforced by hashing the program information to generate a program key as explained further below. Therefore, a program cannot be viewed using digital coupons unless it is actually offered to coupon holders.

However, pirates may attempt to tamper with the delivery of the coupons. The main objective of the pirate is to defeat the system by providing false messages (e.g., "spoofing") to obtain digital coupons without having to perform any of the coupon preconditions. In accordance with the present invention, different ways to securely delivery the COUPON_CREDIT field to terminals are discussed.

There are three ways to deliver the digital coupons, i.e., using a group re-key EMM, an IPPV

purchase linkage, or a program re-key ECM. The group re-key message technique can handle a distribution of coupons to a general population of terminals as well as providing a method that is linked to IPPV purchases. IPPV purchase linkage could be done independently from group re-key message delivery, however. The delivery of coupons via the group re-key message may be mutually exclusive from the program re-key technique since, with the program re-key technique, the network controller or PPV order processing center does not know how many coupons a subscriber might earn using the method where the coupons are generated internally by the terminal. Thus, management of group re-key based coupons cannot be handled as securely inside a terminal unless group re-key based coupons are tracked separately from program re-key based coupons.

Direct delivery of coupons through a group re-key entitlement management message (EMM) is the most straightforward way to control the delivery of coupons to subscribers. This approach is suitable for IPPV service providers who decide to reward particular subscribers based, for example, on previous purchasing volume. The service provider thus knows which particular subscribers are to receive the digital coupons and can therefore direct a unit specific EMM to each of the subscribers.

Additionally, the group re-key EMM approach is suitable for providing subscribers with digital coupons along with a designator which allows text message commercials. These on-screen displays convey

advertising and can be overlaid on top of the video and audio displayed. As discussed previously, these subscribers are willing to view such commercials to obtain digital coupon benefits such as discounts on other programs. Again, the service providers know exactly which subscribers agreed to have text message commercials delivered to them, and can therefore provide them with the corresponding digital coupons through an EMM.

Moreover, using the COUPON_CREDIT and VH_LIMIT data fields, individual service providers can send digital coupons to individual subscribers. Each service provider is identified by the field VIDEO_PROVIDER_ID. If a pirate were to synthesize a group key message with a false VIDEO_PROVIDER_ID and COUPON_CREDIT, thereby resulting in a bad group key, the pirate might be able to create false VIDEO_PROVIDER_ID, COUPON_CREDIT pairs inside the terminal.

One solution to the above problem is implemented using EMM authentication. In particular, if the group re-key EMM used by a transmitting satellite, for example, is hashed. The hash is then encrypted to create a signature. A pirate cannot produce a counterfeit group re-key EMM without knowledge of a terminal's unit keys, and the key hierarchy. In this case, the counterfeit message will be rejected without processing. Another way to authenticate a message is to use public key cryptography to sign or encrypt the

entire message. This can also prevent the generation of counterfeit messages.

Furthermore, a pirate may use "replay" attacks using legitimately built messages. In this case, a legitimate message is saved and provided to a terminal months after the message was originally created and first used to make new COUPON_CREDIT inside the terminal. To protect against this, group sequence numbers may be incremented.

Moreover, the pirate may attempt to replay the message in the same month that it was generated. To protect against this, new COUPON_CREDIT could be tracked during a particular month. At the end of the month, it can be added to COUPON_CREDIT that was earned in previous months. When the COUPON_CREDIT FIELD is sent to the terminal during the month in the group re-key EMM, it would be the absolute coupon credit issued to a particular terminal. Moreover, an additional field, COUPON_DEBIT, may be created inside the terminal to manage the coupons from a particular service provider for that month. Another way to secure against replay attacks within the same month would be to sequence the EMMs themselves. The decoder may then be able to differentiate between a new message and one that it has seen before. Another method would be to include a date/time parameter in the EMM. As with a sequence number, this field can only go forward or stay the same, but cannot be changed to a past value.

For each individual service provider, any new COUPON_CREDIT value must be authenticated, e.g., in the group re-key message just as with the COUPON_CREDIT and VH_LIMIT fields since merely signing the message or using public key cryptography will not prevent such replay attacks. Moreover, each new coupon record should track the sequence number which indicates when it was generated. When the group key epoch occurs, the group re-key EMM that was originally used to create the coupon record will not be able to create additional coupons since the message will be old. At that time, the new COUPON_CREDIT can be added to old COUPON_CREDIT. If, during the next month, no new coupons are sent to the terminal, and all of the existing coupons are used, then the entire coupon record can be erased.

In a second digital coupon delivery method, coupons are delivered through an IPPV buy linkage. With each IPPV purchase, a bit in the program re-key message allows a service provider to deliver one or more coupons automatically and instantly to subscribers without waiting to get a report back or performing a "trip" (e.g., delivery) with coupons as in the group re-key method discussed above. If a subscriber did not have any coupons from a particular service provider before, a new service provider coupon record is made. The coupon creation process is therefore tightly linked to actual purchases of IPPV programs. After a number of coupons have been accrued, the subscriber can redeem them. Typically, a service provider will offer

digital coupons which can be redeemed only for that service provider's programs. However, groups of service providers may collaborate to provide interchangeable coupons if desired.

In another possible pirate attack, a pirate may attempt to manipulate the number of coupons which are awarded when performing the digital coupon preconditions, e.g., such as purchasing a number of IPPV programs. One possible solution uses a DES hash with encryption (e.g., signature) or public key encryption of the program re-key message. If the number of coupons is authenticated in the IPPV report-back, then the pirate's manipulation of this field would cause a bad cryptographic field.

If the pirate does know the group key, counterfeiting could occur but may be detectable if the view history information (e.g., usage pattern data) is used to hash the coupon value and is sent along in the report-back.

Moreover, if public key cryptography was used in the delivery of the program re-key message, then, even if the pirate knew the group public key, a message still could not be synthesized since the group private key would not be known. Public key cryptography has a distinct advantage over secret key cryptography since the group encrypt or private key is not in the terminal. Consequently, VLSI probing and other attacks against the terminal cannot reveal the key.

In a third delivery method in accordance with the present invention, digital coupons are delivered

in conjunction with extended commercial programs known as "infomercials." Preferably, a subscriber is rewarded with digital coupon credits only after viewing the program for a specific amount of time. Furthermore, to prevent the subscriber from simply tuning in the program and walking away, it might be advantageous to require some sort of subscriber involvement such as a control input which is requested by the user interface.

A pirate may be able to alter code in a non-secure processor to automatically provide the subscriber involvement control signal. However, the amount of time that the program must be viewed, or at least tuned in, can be secured. To do this, there is no need to track the maximum time that the program lasts since the infomercial service provider is essentially paying the subscriber to view the program. The PROGRAM_PAYOUT_DURATION field can be loaded into a countdown timer to enforce the minimum viewing time requirement of the digital coupon preconditions. The coupons are thus issued when the timer counts down to zero, and the timer counts down only when the infomercial channel is tuned in. Essentially, this ties up the terminal to tune in the infomercial and precludes it from tuning in another channel.

Furthermore, the COUPON_RECORD_DURATION field is required to determine when the program record should be expunged from the secure processor's memory.

A pirate may attempt to manipulate the field in the program re-key ECM, which indicates how many coupons are to be awarded when viewing the infomercial. One possible solution is to use a DES hash (e.g., signature) or public key encryption of the program re-key message. Like the other attacks described above, signing the program re-key message makes it hard for the pirate to counterfeit the program re-key message without knowledge of the group secret key or private key. Moreover, if public key cryptography is used in the delivery of the program re-key message, then, even if the group public key was known by a pirate, a message could not be synthesized since the group private key is not known.

In another possible pirate attack, the pirate records legitimate program messages, and repeatedly plays back the messages to the terminal. The pirate may modify the terminal to provide control inputs directly to the chip or via the user interface to increase the number of coupons held by the chip. One solution to this attack is to create and store a program record in memory. In particular, the COUPON_CREDIT field is used to authenticate the number of coupons being awarded. In addition to COUPON_PKG_ID and COUPON_PROVIDER_ID, two duration timers are needed instead of one. One timer, COUPON_PAYOUT_DURATION, tracks how long the subscriber must be tuned to the program before coupons are awarded, and the other time, COUPON_RECORD_DURATION, tracks when the program

record can be expired from memory. The amount of time that a record should be retained might be two months, for example.

Delivery of program re-key messages by public key is a safer mechanism. A pirate would need to cryptographically search for the group private key to alter program re-key messages. The group private key is not delivered to any terminal anywhere in the network. The length of the group public keys delivered could expand according to the perceived piracy threat. And, the group public and private keys may be changed through the delivery of new EMMs. If there is a system breach, the infomercial feature could be abandoned simply by making program re-key ECMs with the coupon issuing feature missing, or not allowing IPPV purchases with coupons.

In the above discussion, it was seen that there are three distinct methods for delivering coupons to the terminals. The first is group re-key EMM based, the second is tightly tied to IPPV authentication, and the third is Program Re-key ECM based using the "infomercial" concept.

The group re-key method is similar to how IPPV is implemented with the only absolute COUPON_CREDIT given, and requiring a COUPON_DEBIT field to exist inside the terminal for each service provider with a COUPON_PROVIDER_ID.

The IPPV purchase linkage method is a hybrid between the group re-key method and the program re-key method since it takes advantage of IPPV authentication that is already done and securely

authenticated inside the terminal, and yet is delivered by a program re-key ECM with the appropriate parameters set. Coupons using this method can only be delivered through a real IPPV purchase.

With the program re-key method, coupon redemption may or may not be tied to the view history report-back. For auditing of viewership, coupon redemption is tied to the report-back since a communication link such as a telephone network is required.

Accordingly, it can be seen that the present invention provides a system for transmitting digital coupons to subscriber terminals for various promotional purposes. By delivering and managing the coupons electronically, the coupons are more likely to be used by the subscribers, and distribution and handling costs for the promoters are significantly reduced. Subscriber loyalty can be rewarded, while subscribers can also be selectively targeted to try out programming in which they are likely to have a special interest. Subscribers can be even be encouraged to view commercial programming such as infomercials. Additionally, with an optional report back feature, terminal usage pattern data can be retrieved and analyzed to determine the effectiveness of the promotions and to gather additional demographic and individual data. Furthermore, the integrity of the scheme can be assured with various encryption techniques.

Although the invention has been described in connection with various specific embodiments, those skilled in the art will appreciate that numerous adaptations and modifications may be made thereto without departing from the spirit and scope of the invention as set forth in the claims.

For example, accounting of the coupon credit balance may be maintained by the network controller or other entity apart from the terminal. This accounting may be updated real-time as the coupon balance changes, or periodically, such as where an automatic telephone report back capability is provided.

4. BRIEF DESCRIPTION OF THE DRAWINGS

FIGURE 1 is a block diagram of a communication system in accordance with the present invention.

FIGURE 2 is a block diagram of a subscriber terminal in accordance with the present invention.

FIGURE 3 is a block diagram illustrating a decryption hierarchy for use in accordance with the present invention.

FIGURE 4 is an on-screen display for a user interface in accordance with the present invention.

FIGURE 5 is another on-screen display for a user interface in accordance with the present invention.

FIGURE 6 is yet another on-screen display for a user interface in accordance with the present invention.

FIGURE 7 is a flowchart illustrating a method for providing digital coupons in accordance with the present invention.

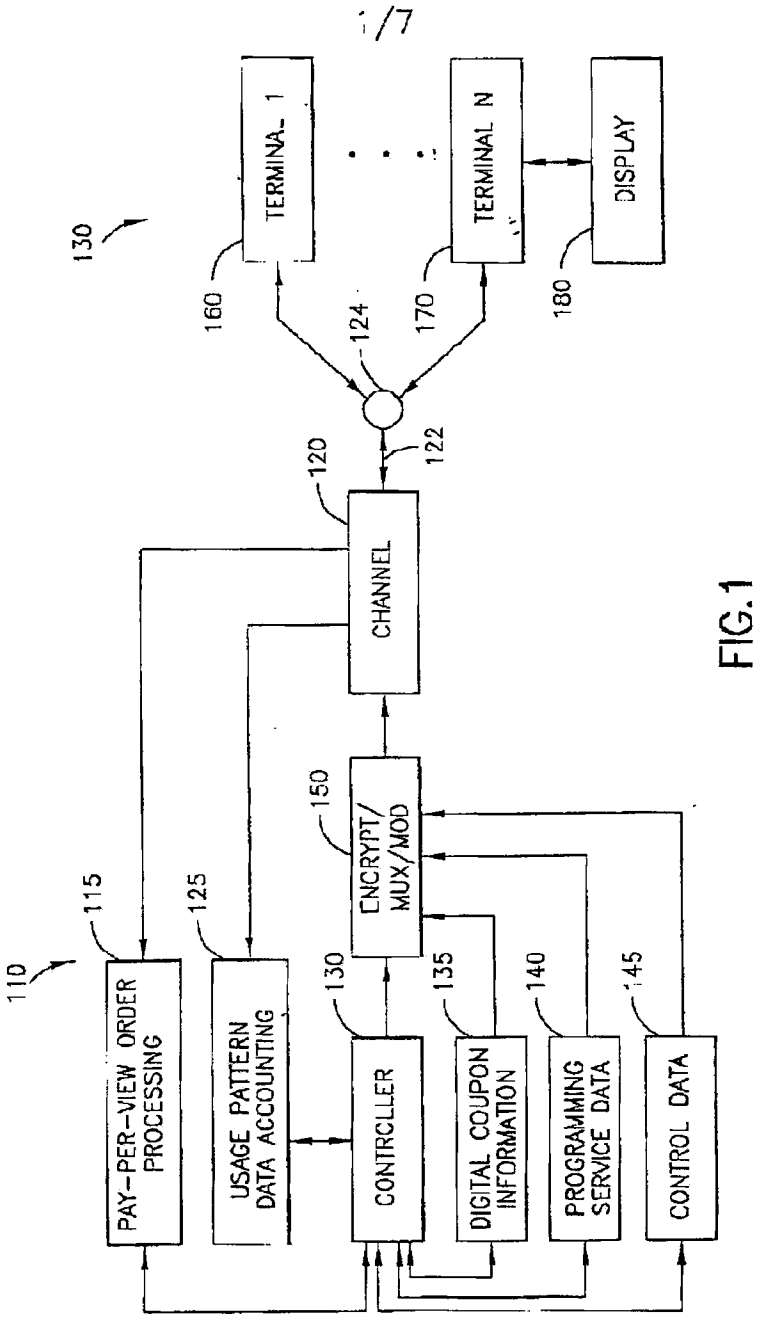
1/7
110
115
125
130
135
140
145
150
120
122
124
130
160
170
180
PAY-PER-VIEW ORDER PROCESSING
USAGE PATTERN DATA ACCOUNTING
CONTRCLLER
DIGITAL COUPON INFORMATION
PROGRAMMING SERVICE DATA
CONTROL DATA
ENCRYPT/ MUX/MOD
CHANNEL
TERMINA_ 1
TERMINAL N
DISPLAY

FIG.1

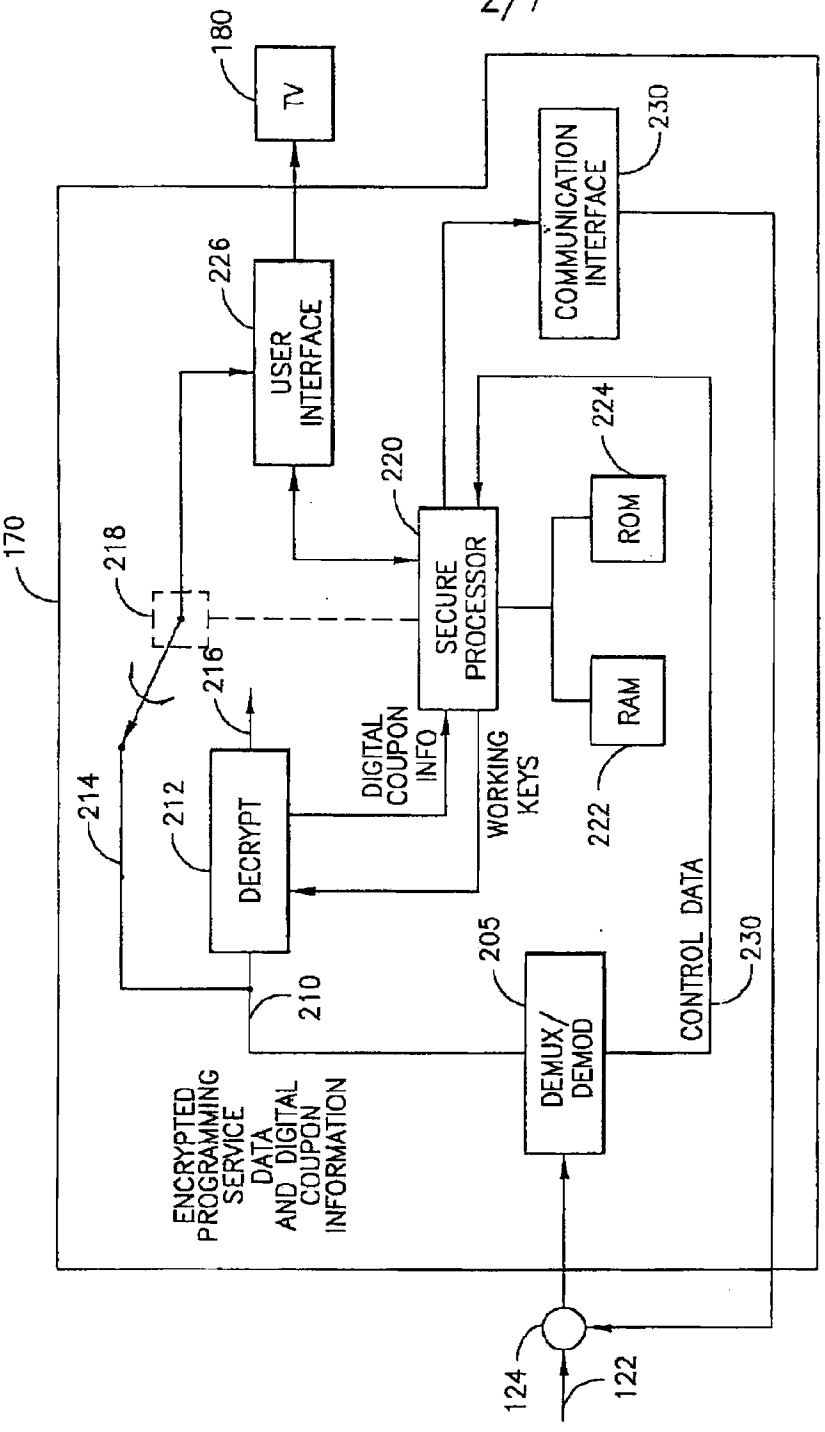
180
TV
230
COMMUNICATION INTERFACE
226
USER INTERFACE
224
ROM
220
SECURE PROCESSOR
170
218
216
214
212
DECRYPT
DIGITAL COUPON INFO
WORKING KEYS
RAM
222
205
DEMUX/ DEMOD
CONTROL DATA
230
210
ENCRYPTED PROGRAMMING SERVICE DATA AND DIGITAL COUPON INFORMATION
124
122

FIG.2

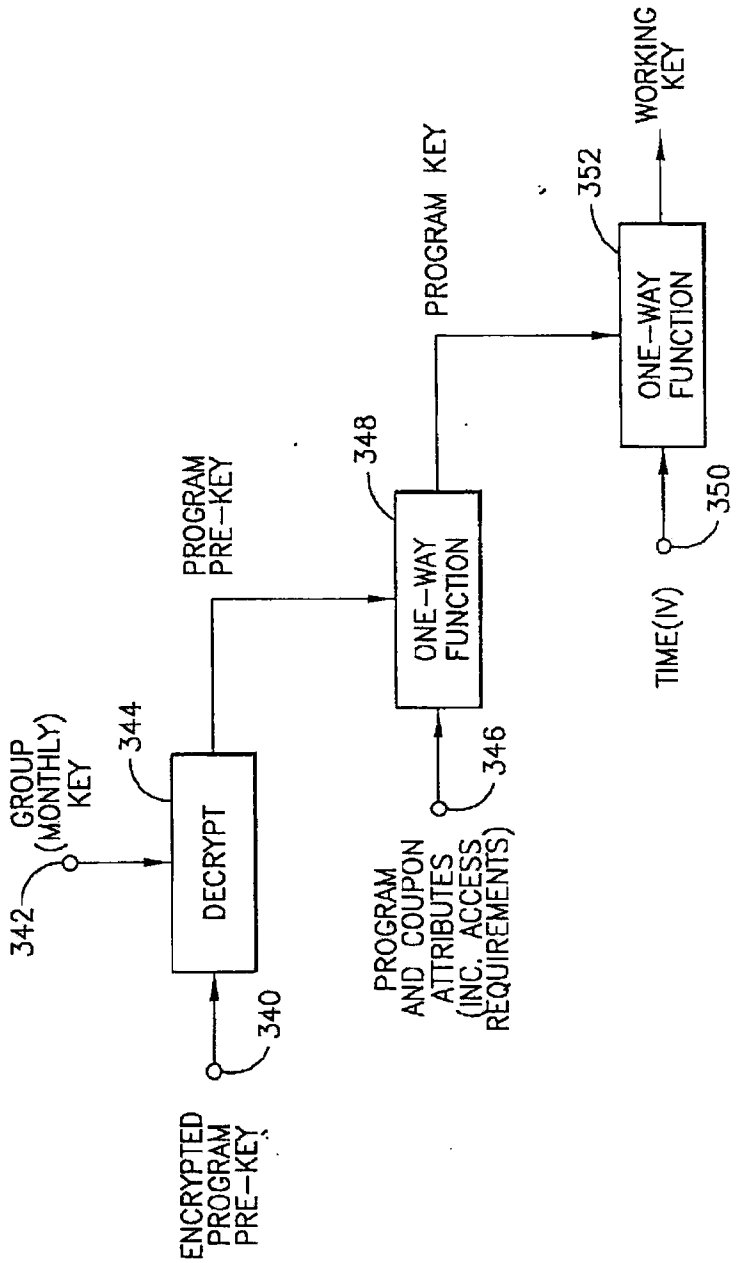
ENCRYPTED PROGRAM PRE-KEY
340
DECRYPT
342
GROUP (MONTHLY) KEY
344
PROGRAM PRE-KEY
ONE-WAY FUNCTION
348
PROGRAM AND COUPON ATTRIBUTES (INC. ACCESS REQUIREMENTS)
346
PROGRAM KEY
ONE-WAY FUNCTION
352
WORKING KEY
TIME(IV)
350

FIG.3

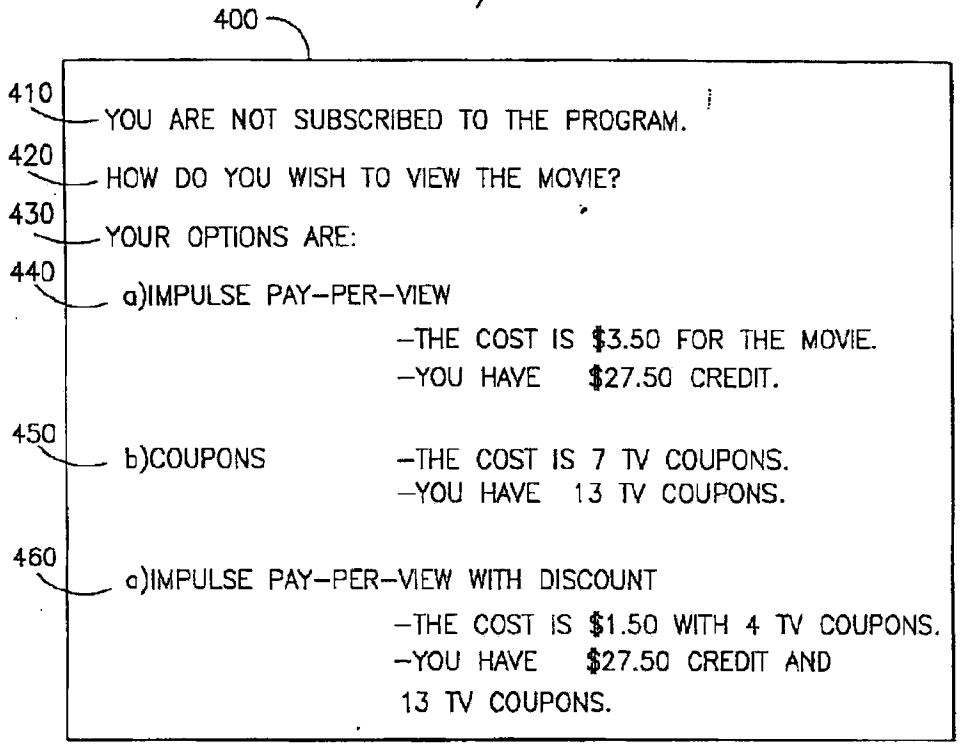
400
410
YOU ARE NOT SUBSCRIBED TO THE PROGRAM.
420
HOW DO YOU WISH TO VIEW THE MOVIE?
430
YOUR OPTIONS ARE:
440
a)IMPULSE PAY-PER-VIEW
-THE COST IS $3.50 FOR THE MOVIE.
-YOU HAVE $27.50 CREDIT.
450
b)COUPONS
-THE COST IS 7 TV COUPONS.
-YOU HAVE 13 TV COUPONS.
460
a)IMPULSE PAY-PER-VIEW WITH DISCOUNT
-THE COST IS $1.50 WITH 4 TV COUPONS.
-YOU HAVE $27.50 CREDIT AND
13 TV COUPONS.

FIG.4

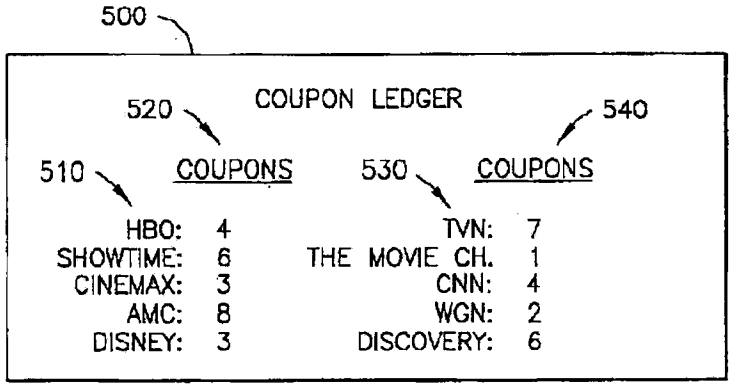
500
COUPON LEDGER
520
540
510
COUPONS
530
COUPONS
HBO: 4
SHOWTIME: 6
CINEMAX: 3
AMC: 8
DISNEY: 3
TVN: 7
THE MOVIE CH. 1
CNN: 4
WGN: 2
DISCOVERY: 6

FIG.5

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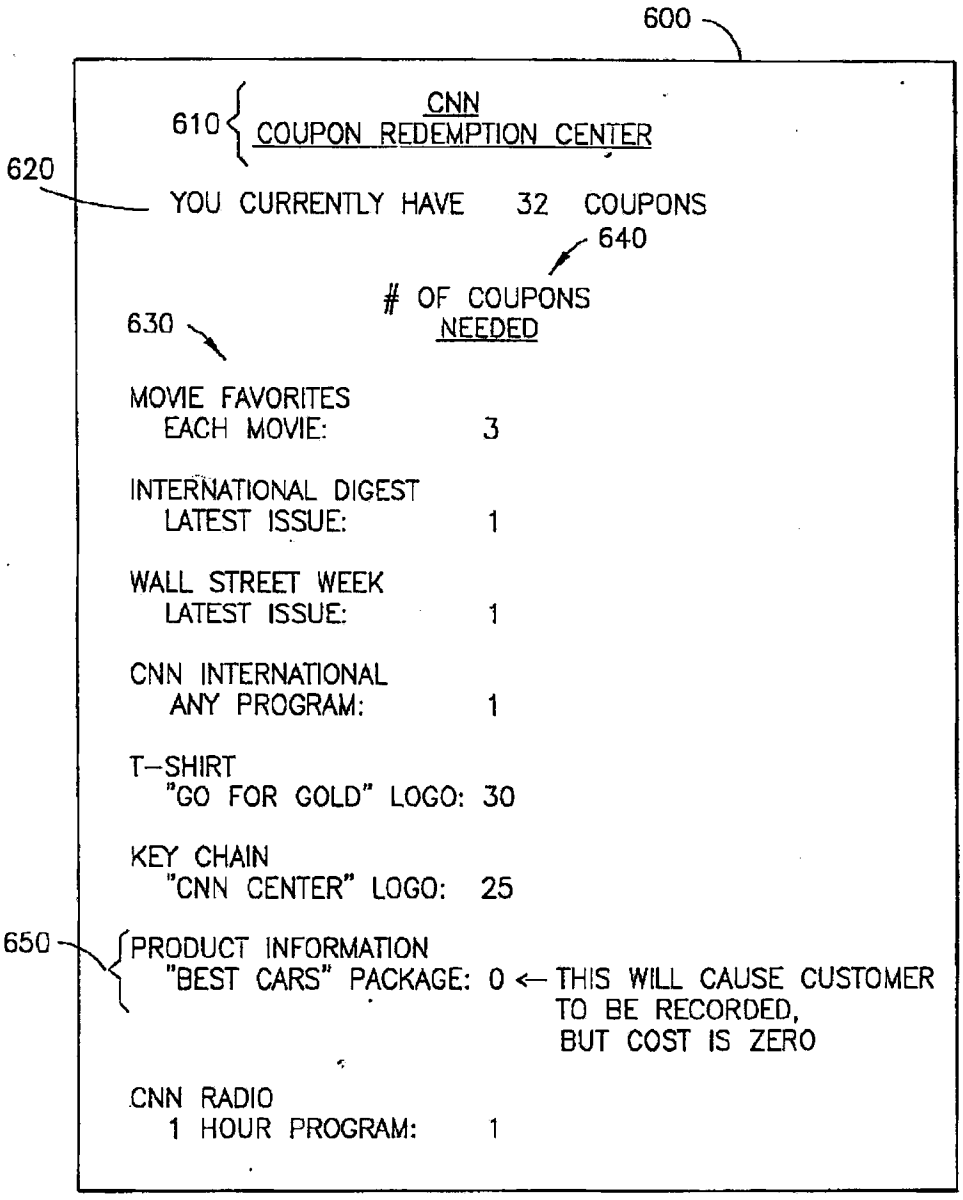
600
610
CNN
COUPON REDEMPTION CENTER
620
YOU CURRENTLY HAVE 32 COUPONS
640
OF COUPONS NEEDED
630
MOVIE FAVORITES
EACH MOVIE: 3
INTERNATIONAL DIGEST
LATEST ISSUE: 1
WALL STREET WEEK
LATEST ISSUE: 1
CNN INTERNATIONAL
ANY PROGRAM: 1
T-SHIRT
"GO FOR GOLD" LOGO: 30
KEY CHAIN
"CNN CENTER" LOGO: 25
650
PRODUCT INFORMATION
"BEST CARS" PACKAGE: 0 ← THIS WILL CAUSE CUSTOMER TO BE RECORDED, BUT COST IS ZERO
CNN RADIO
1 HOUR PROGRAM: 1

FIG.6

FIG.7A | FIG.7B

FIG.7

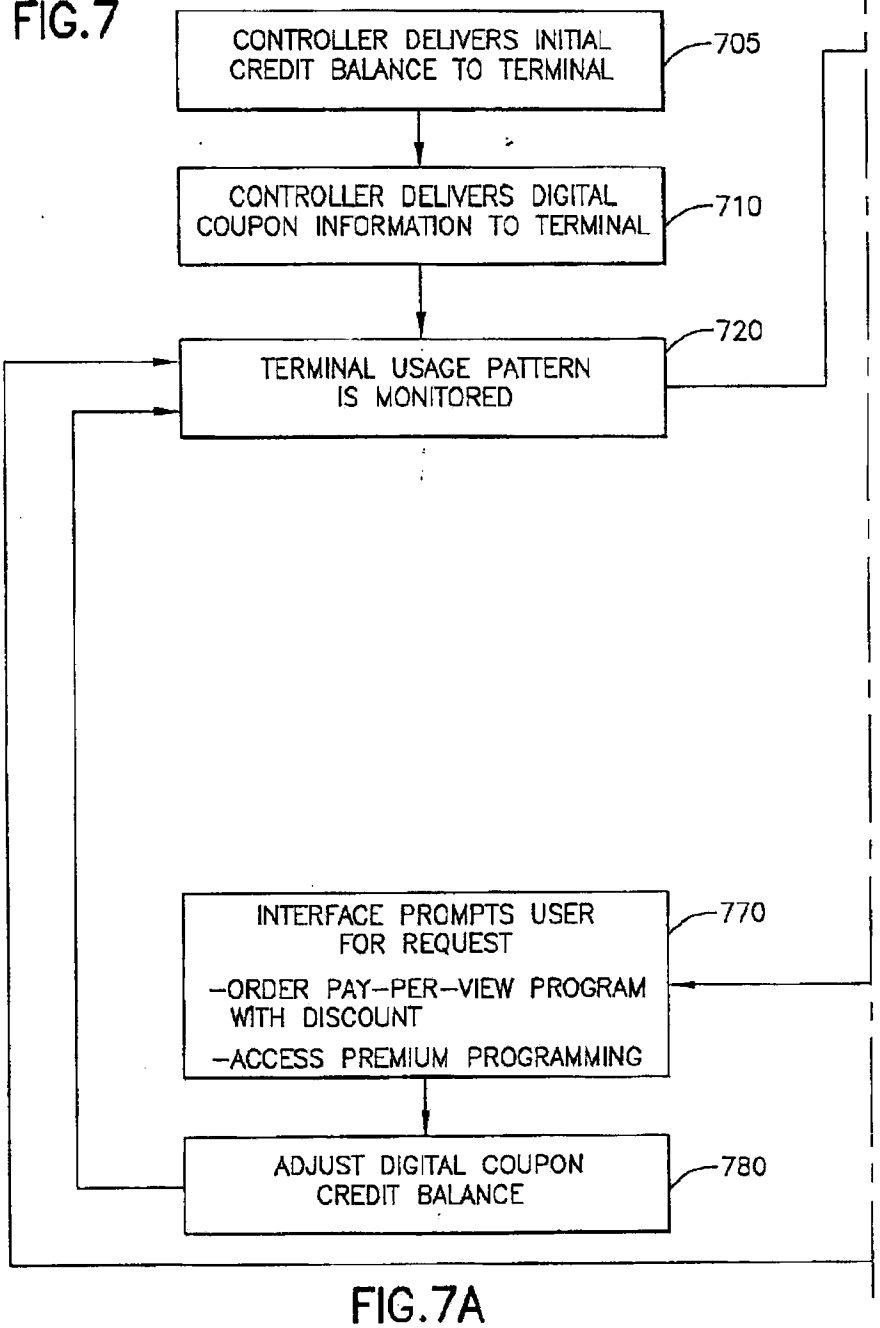

FIG.7A

7/7

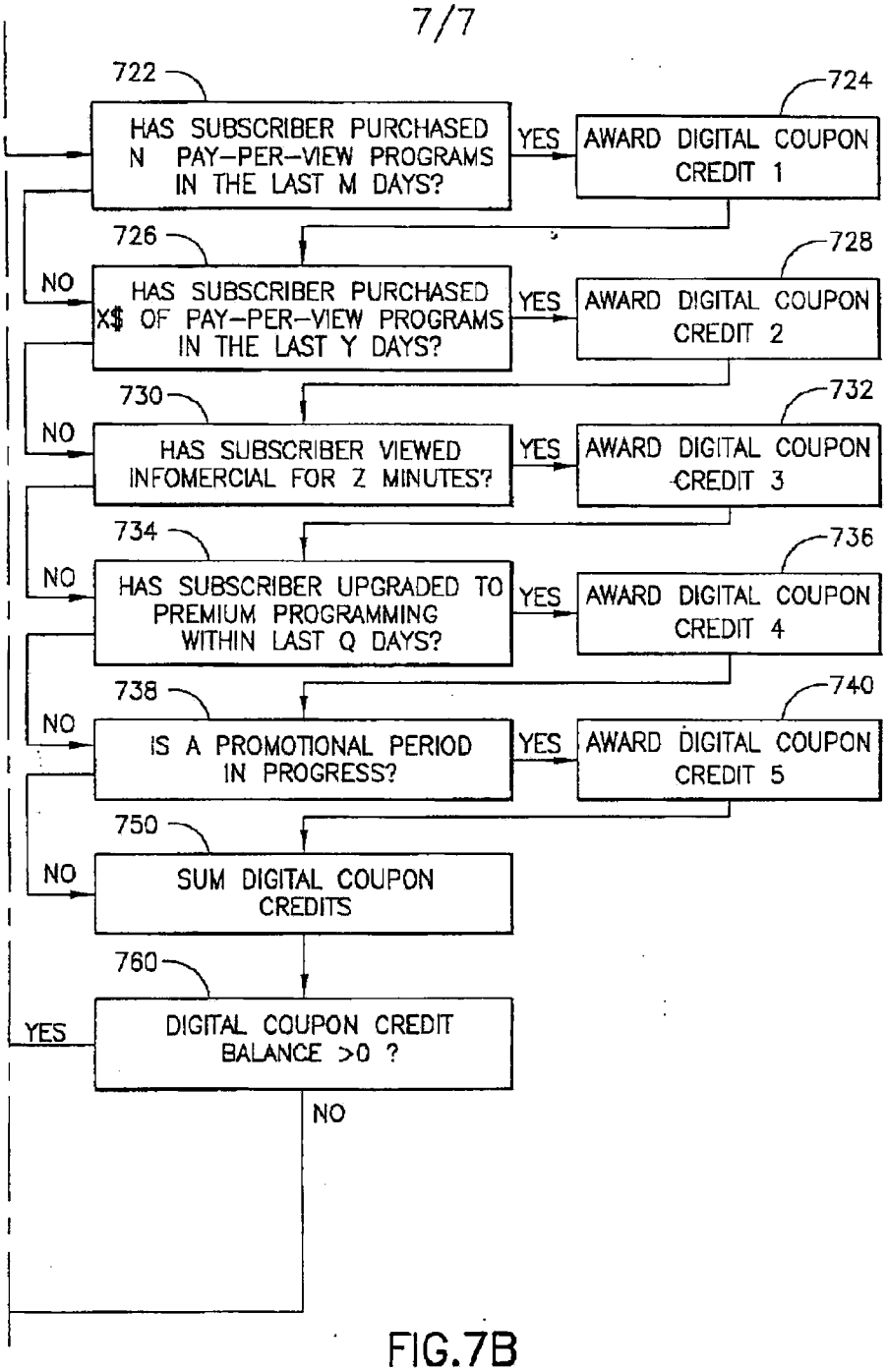
722
HAS SUBSCRIBER PURCHASED N PAY-PER-VIEW PROGRAMS IN THE LAST M DAYS?
YES
724
AWARD DIGITAL COUPON CREDIT 1
NO
726
HAS SUBSCRIBER PURCHASED X$ OF PAY-PER-VIEW PROGRAMS IN THE LAST Y DAYS?
YES
728
AWARD DIGITAL COUPON CREDIT 2
NO
730
HAS SUBSCRIBER VIEWED INFOMERCIAL FOR Z MINUTES?
YES
732
AWARD DIGITAL COUPON CREDIT 3
NO
734
HAS SUBSCRIBER UPGRADED TO PREMIUM PROGRAMMING WITHIN LAST Q DAYS?
YES
736
AWARD DIGITAL COUPON CREDIT 4
NO
738
IS A PROMOTIONAL PERIOD IN PROGRESS?
YES
740
AWARD DIGITAL COUPON CREDIT 5
NO
750
SUM DIGITAL COUPON CREDITS
760
DIGITAL COUPON CREDIT BALANCE >0 ?
YES
NO

FIG.7B

1.Abstract

Digital coupons are selectively transmitted in a communication network to subscriber terminals for promotional purposes. Subscribers automatically receive coupon credits when they meet the preconditions of the digital coupons. Free or reduced price pay-per-view (PPV) programming in particular may be provided when a subscriber purchases a given number of PPV programs at a regular price. The terminals maintain a running balance of available coupon credits and inform the subscriber via a user interface of the available balance. Subscribers can be rewarded for viewing commercial messages by awarding coupons which can be immediately redeemed for PPV programs. With an optional report back capability, terminal usage pattern data can be retrieved and analyzed by program service providers to determine the effectiveness of the promotions and to gather additional demographic and individual data. The integrity of the scheme is assured with encryption techniques.

2.Representative Drawing

None